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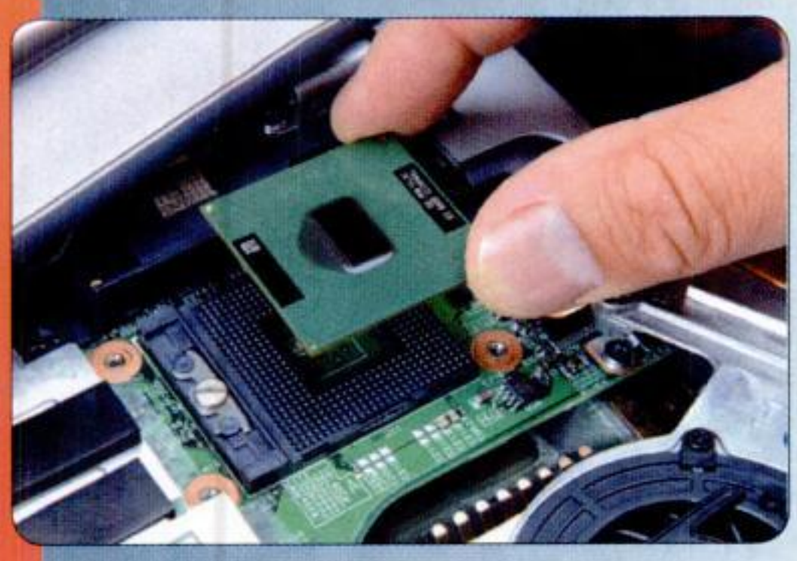

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Ed Word

It'sTime to Cross the Final Frontier

Please send feedback and Turkish Delight to ***will@maximumpc.com.***

I've been building computers for more than 10 years now. I've built dozens-upon-dozens of desktop machines for friends, family, the Maximum PC Lab, and my own personal use. Odds are if you're reading this magazine, you have too. Despite being a card-carrying member of the PC-building elite, I still use a laptop that was built on an assembly line somewhere in Texas. But I won't have to anymore.

This month, Editor Gordon Mah Ung shows you how to build your own laptop. At first we weren't sure it was a good idea to run the story, even in *Maximum PC*. After all, it's one thing to build an easily serviced desktop machine without a benevolent manufacturer to handle broken parts and software snafus. When you build your own laptop, though, you're really on your own. Before he started, even Gordo questioned the wisdom of a DIY laptop—and the story was *his* idea!

When he got a look at the variety of parts he could use to build the laptop, his tune quickly changed. He purchased exactly the components he needed to get the most bang for his laptop dollar. He built a kick-ass laptop with a super-fast 2.1GHz Pentium M, a 100GB hard drive, and a GeForce Go 6600, for about $1,500. I spec'd out a comparable laptop from an online retailer and the total cost was over $2,300—with a pokey 5400rpm hard drive instead of the 7200rpm one Gordon used!

The laptop manufacturers limit your configuration choices so they can extract the maximum cash from you for premium hardware. If you start with a vendor's cheapest machine, you might be able to make some small configuration changes, but you won't be able to add a huge hard drive, first-class CPU, or 2GB of memory. Some of these are actual limitations in the hardware—many notebook mobos don't support tons of RAM or the fastest GPUs—but mostly the limitations are artificial. By building your own, you can get the most powerful hardware at a better price. I don't know about you, but that's precisely the reason I started building my own rigs.

Keen-eyed readers will also notice that we've devoted nine pages to backing up, copying, and converting all of your digital media. I've pissed and moaned about the anti-consumer DRM technologies enough, so we decided to do something about it. Starting on page 22, you'll find our most complete guide to converting your media into consumer-friendly, DRM-free formats that work anywhere. Enjoy the story, but please use your unlocked media responsibly. Don't steal.

Now I've got to get back to the Lab; it's time I built *my* laptop!

Will Smith

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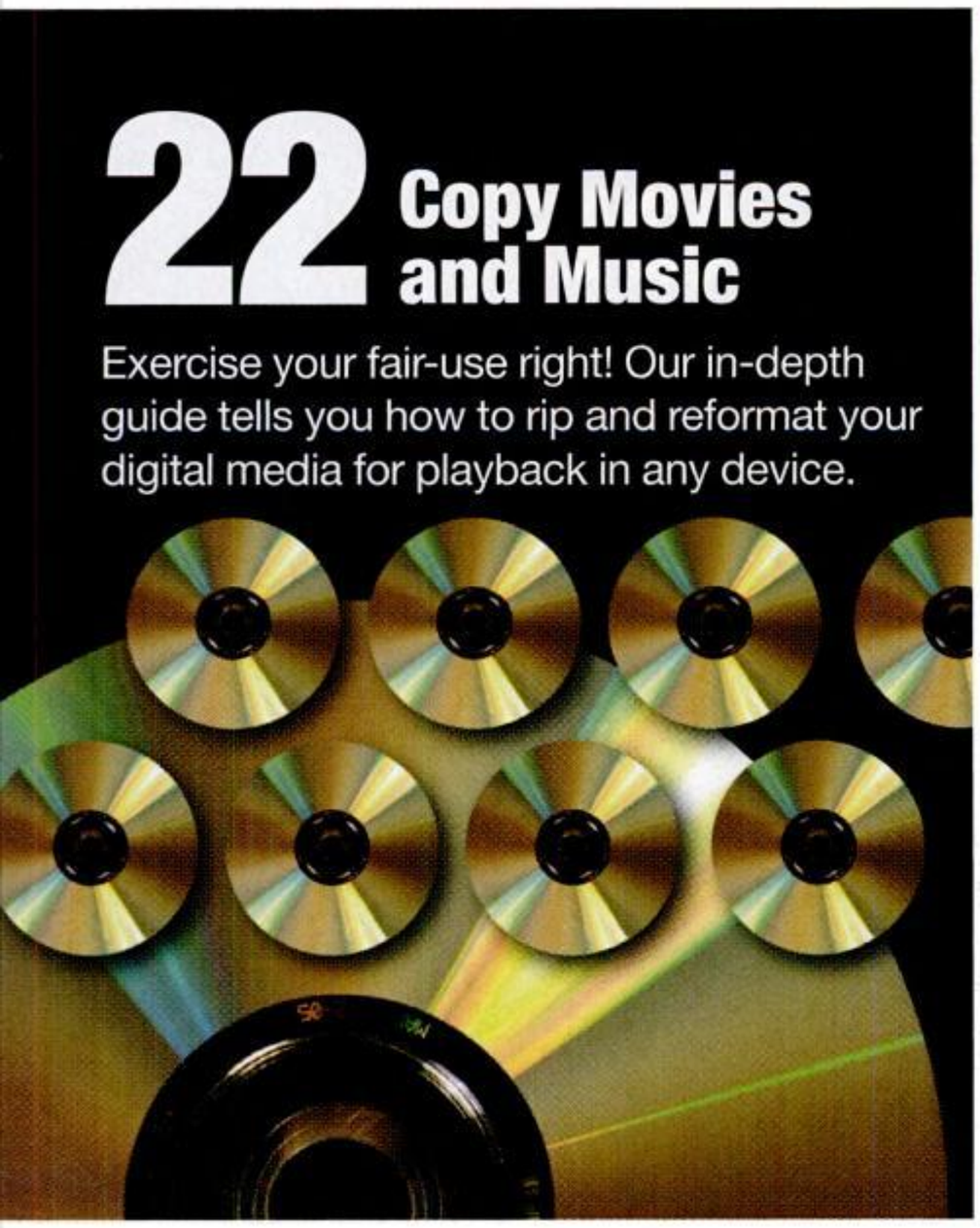

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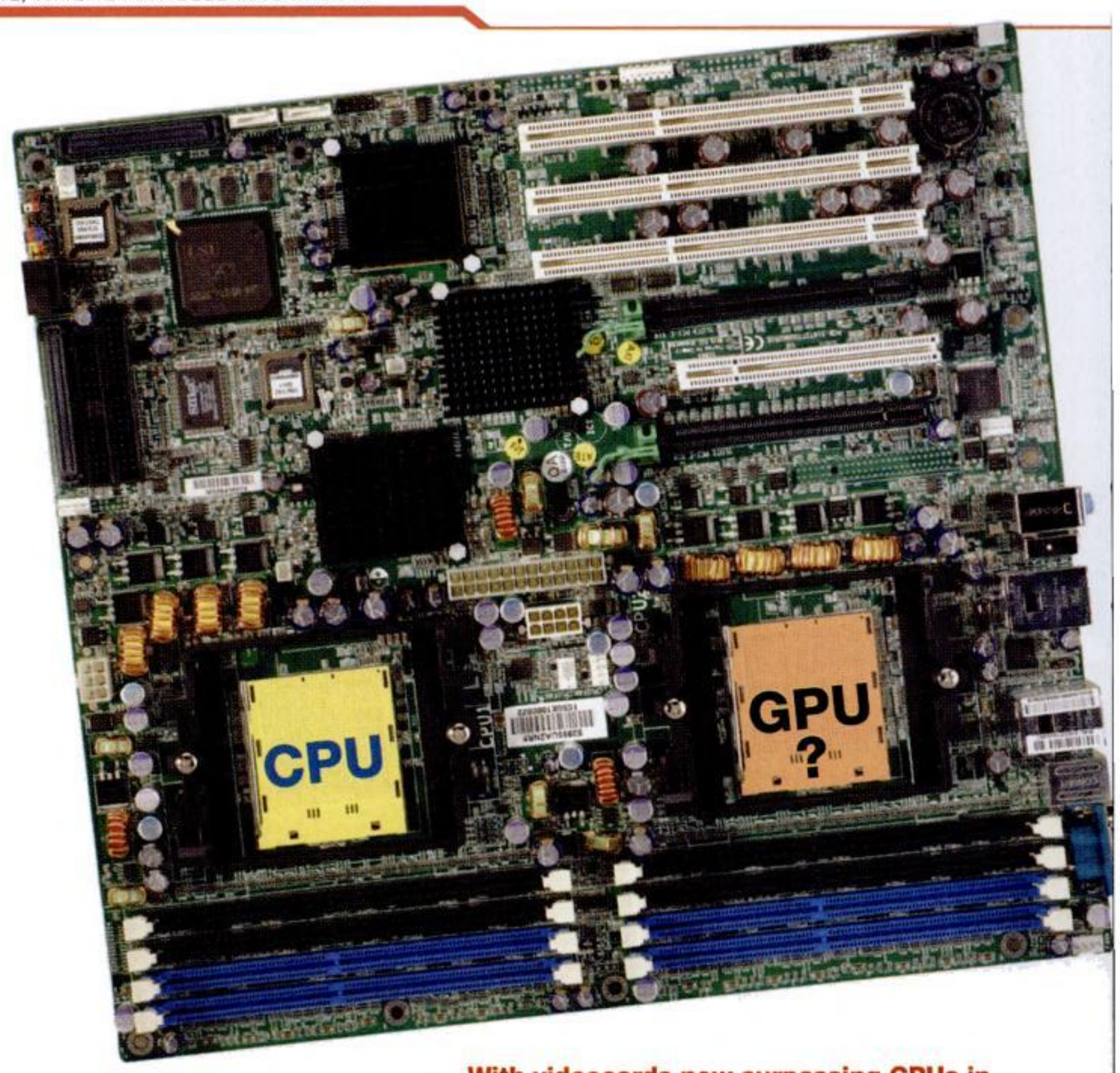
Will You Be Socketing Your Next GPU?

CPUs are getting cooler, but GPUs are getting hotter. Temperature management could require GPUs to move from a card to a socket



With videocards now surpassing CPUs in thermal output, could the GPU's days in a cramped PCI Express slot be numbered?

Just as New Yorkers flee to Florida to escape the harsh winters, rumor has it that today's GPU might one day migrate to a motherboard socket, or out of the case entirely, to escape rising temperatures and bulging cooling mechanisms.

Socketing a GPU onto a motherboard and allocating space to it (and its cooler) might help mitigate the thermal restraints on videocards by freeing the GPU from the narrow slot it exists in today. Sound a little far-fetched? A socketed graphics chip for the PC isn't a new idea. Defunct graphics company Rendition proposed a standard socket interface for graphics on the motherboard as far back as 1998.

Called Socket X, Rendition's design would have replaced the AGP interface, but it never made it out of the labs as a shipping product. Rumors of a socketed GPU were rekindled late last year when tech website Anandtech.com reported that nVidia was secretly working on a flip-chip GPU that would fit into a socket on the motherboard. nVidia officials declined to comment on the report.

Analyst Jon Peddie of Jon Peddie Research pooh-poohed the idea. "No way," said Peddie of a socketed GPU. The problem, Peddie said, is the same one that killed Socket X: bandwidth. Unless RAM is included in the die or on the package, main system memory is far too slow to support today's and tomorrow's GPUs.

Peddie does foresee desktop vendors adopting notebook graphics modules. Notebooks seem primed to supplant desktops as the standard PC, so notebook add-in boards should become quite common—and probably cheaper and easier to come by than PCI-E cards. But even then, Peddie doesn't see graphics for enthusiasts moving to modules or sockets, because of performance constraints associated with the smaller designs.

Raja Koduri, director of advanced technology development at ATI, agreed that a module or socket system is easy to do and will likely be used for special formfactors, but he doesn't see it as a solution that will satisfy enthusiasts in the foreseeable future. Still, power and heat problems aren't going away.

"Max performance is going to always come at the cost of power and heat," he said. It doesn't help that the PC's design is based on the CPU being the primary heat generator. With the shift in thermals from the CPU to the graphics card, Koduri said we might one day see two types of formfactors: one for the average Joe and one for the enthusiast. Both would address thermal problems, but the enthusiast design would provide additional cooling and power for multiple-graphics cards.

It's also possible that someday the graphics card will move out of the PC completely. The PCI Express workgroup has already ratified an external cable spec that it claims could one day carry enough bandwidth to place your graphics card outside the chassis.

HOW HOT ARE THEY?

MODEL	THERMAL OUTPUT
PENTIUM D	130 watts
GEFORCE 7800 GTX 512MB	122 watts
RADEON X1900XL	120 watts
3.8GHZ PENTIUM 4	115 watts
GEFORCE 6800 ULTRA	110 watts
AMD X2	110 watts
GEFORCE 7800 GTX 256MB	100 watts
GEFORCE 7800 GT	85 watts
GEFORCE 7800 GS	75 watts
ATHLON 64	89 watts
CORE DUO	31 watts

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HD-DVD vs. Blu-ray: Round 1

The next-gen optical-storage format war has been warming up, but with the first HD-DVD drives poised for release, the kerfuffle is bound to escalate. For those of you still on the fence over which format to adopt, check out this handy comparison chart and then vote with your wallet.

NEXT-GEN **OPTICAL STORAGE**

	HD-DVD	BLU-RAY
SUPPORTERS	Toshiba, NEC, Sanyo, HP, Microsoft, Intel, movie studios	LG, Mitsubishi, Panasonic, Pioneer, Samsung, Sony, movie studios
STORAGE CAPACITY PER LAYER	15GB	25GB
WILL IT PLAY DVD?	Yes	Maybe*
TRANSFER RATE	36Mb/s	36Mb/s
VIDEO SPEC	MPEG-2, MPEG-4, H.264	MPEG-2, MPEG-4, H.264
AUDIO SPEC	Dolby Digital Plus, DTS-HD	Dolby Digital Plus, DTS-HD
DRM	Digital watermark, possible real-time monitoring for hacking attempts	Mandatory Managed Copy, ROM-Mark, BD+ dynamic encryption, digital watermark

**DVD compatibility is not part of the spec, but manufacturers can implement it.*

Which Format is Better?

As you can see, both formats are close in terms of features and specs (which begs the obvious question: Why can't the industry just agree on one format?). Both will have gnarly DRM implemented, and movie studios are offering tacit support for both formats. HD-DVD appears poised to beat Blu-ray to market by at least six months, which may sway early adopters. But Blu-ray has some big backers and significantly higher capacity, which means it'll probably be a long, drawn-out fight, with us (the consumers) caught in the middle.

Small Formfactor—Big Performance

Falcon Northwest and Monarch Computer launch SFF rigs with dual graphics cards. That's what we call power-to-go!

Falcon's Fragbox (left) sports dual 512MB GeForce 7800 GTX boards. The Monarch Revenge edition touts dual EVGA 256MB 7800 GTX cards. Both should be on sale by the time you read this.

FAST FORWARD

TOM **HALFHILL**

AMD Hooks Up with Cinderella

AMD is enjoying its resurgence against Intel partly by moving more aggressively in new directions, such as multicore processors and 64-bit x86 extensions. But Intel is catching up, forcing AMD to hunt for the next big thing. AMD's most recent maneuver is to license a radical new memory technology called Z-RAM.

Z-RAM is from Innovative Silicon, a start-up company in Switzerland. The technology is based on experiments by university researchers in Belgium who were stalled by a technical roadblock in 1990. In 2001, a Swiss engineer came along and solved the researchers' biggest problem. That engineer co-founded Innovative Silicon, which has spent years perfecting the technology. But the company is too small to compete as a chip manufacturer, so it's licensing Z-RAM to other companies.

Z-RAM exploits an electrical phenomenon called the floating-body effect. (Innovative Silicon calls it the Cinderella effect.) Some transistors have an extra insulating layer to reduce unwanted capacitance. Despite this, they still retain some capacitance, which slows them down. But Z-RAM uses the residual capacitance to store a binary state (0 or 1), turning the transistor into a one-bit memory cell.

Normally, a one-bit DRAM cell needs a transistor and a capacitor. Z-RAM needs only a transistor, which doubles as a capacitor (hence the name Z-RAM: zero capacitors). Thanks to this trick, Z-RAM is smaller and faster than conventional DRAM. Although Z-RAM isn't faster than SRAM, it requires much less space, because SRAM bit-cells have four to six transistors.

Z-RAM isn't fast enough to replace SRAM in L1 caches, but it could replace SRAM in the slower L2 or L3 caches. Depending on design goals, Z-RAM caches could have five times the memory capacity of equal-size SRAM caches, or they could provide the same capacity while occupying only one-fifth as much area on chip. Either way, Z-RAM is potentially a big advantage.

Now here's the catch: Z-RAM works only with silicon-on-insulator (SOI) transistors. That's no problem for AMD, which has been using SOI for years. But Intel has steadfastly resisted SOI and has no plans to adopt it. If AMD can successfully integrate Z-RAM into future processors, it will be a new direction that Intel can't follow without reversing course.

Tom Halfhill was formerly a senior editor for Byte magazine and is now an analyst for Microprocessor Report.

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GAME THEORY

THOMAS MCDONALD

Abandon All Hope, Ye Who Enter Here

25 to Life is an embarrassingly bad game, but at least it tells you it's going to suck—and suck mightily—in its very first scene. The opening cinematic is a ludicrous potpourri of overripe urban clichés, giving you fair warning that what lies ahead will be contrived, derivative, and ultimately, insulting.

We're introduced to the main character—a black man named Freeze who has a kid, a woman, and a home, and just wants to get outta da thug life, but he has to pull off just one last job, and then he's out, for good! We're supposed to identify with him—and even feel bad for him—but that's a bit tough to do after the game's first mission, which has Freeze indiscriminately kill hundreds of police officers.

And, even though *25 to Life* tries for balance by letting you play as the good guys (for those of you out in Subjective Morality Land, that would be the police), the developers clearly hate cops, because they give them the dumbest AI this side of MS *Word* Grammar Check.

As someone who's watched the *Godfather* films a dozen times, I'd be a hypocrite to pile on "gangsta" culture for its exaltation of violence and crime, but there is a difference. Most quality mob stories are classical drama with a solid and consistent, albeit warped, internal ethic. Tony Soprano is low-brow capo, but his repeated mantra that "there have to be consequences" is a rock-solid conservative principle.

Thug culture, on the other hand, tends to lack any recognizable ethic beyond "get rich or die tryin'" and "get over here, bee-atch." Sure, I think the music, the clothes, the slang, the entire detritus of urban culture is 10 pounds of crap in a five-pound bag, but as a middle-age, middle-class, married, straight, white, conservative Catholic, suburban male, my opinion on the subject is probably less than authoritative.

Sometimes you can suspend your better nature for the purpose of good entertainment. *Grand Theft Auto* is a corrosive game, but at least it's not a bad game. *25 to Life* is both. It reminds us that clever gameplay is its own redemption, which leaves this little slice of viciousness unredeemed.

Tom McDonald has been covering games for countless magazines and newspapers for 11 years. He lives in the New Jersey Pine Barrens.

What the Heck is Intel Viiv?

At CES, Intel announced a new computing "platform" named Viiv (pronounced Veev). Uh, what? According to Intel, "With an Intel Viiv technology-based PC and supporting devices, you can enjoy a growing universe of digital media content." *Allllrighty*, then. So what is Viiv exactly? A processor? No. Aha, it's a motherboard! Not quite. It's basically a platform for media center PCs, just like Centrino is a platform for notebooks.

For example, a Centrino notebook is any notebook that runs a Pentium M processor, an Intel Wi-Fi connection, and one of Intel's recent chipsets, usually the 915. Viiv works exactly the same way. According to Intel, a Viiv platform consists of the following: a dual-core processor (either Core Duo or Pentium D), an Intel 9XX chipset, an Intel Pro/100 Ethernet connection, and Windows XP Media Center Edition.

Hardware aside, Intel is also aggressively courting content providers in order to offer features such as on-demand movies, TV shows, and even music. Intel has already signed up AOL, DirectTV, and NBC to provide content for Viiv-goers, and it has inked a deal with Google to provide video for the Viiv platform, as well. The biggest announcement so far is a new movie downloading service called ClickStar, which will reportedly deliver "premium" movies to Viiv users within weeks after their theatrical release.

Skeptics say Intel is taking the "platform" route to force vendors to buy the whole package, rather than pick and choose parts. Then again, we have to admit that the Centrino branding sold millions of folks Wi-Fi-enabled laptops, so perhaps the same will be true with Viiv in the living room.

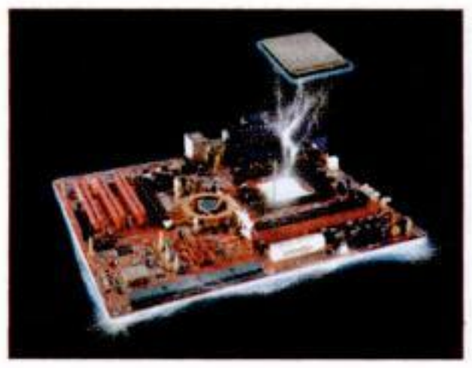
SLI Notebook Unleashed!

nVidia has pulled the wraps off the world's first SLI notebook. This as-of-yet unnamed SKU will boast dual GeForce Go 7800 GTX graphics cards and, presumably, some insane level of cooling. It'll no doubt be great for gaming, and as a lap warmer. We expect to see SLI notebooks shipping by the time you read this.

Abit Merges with USI

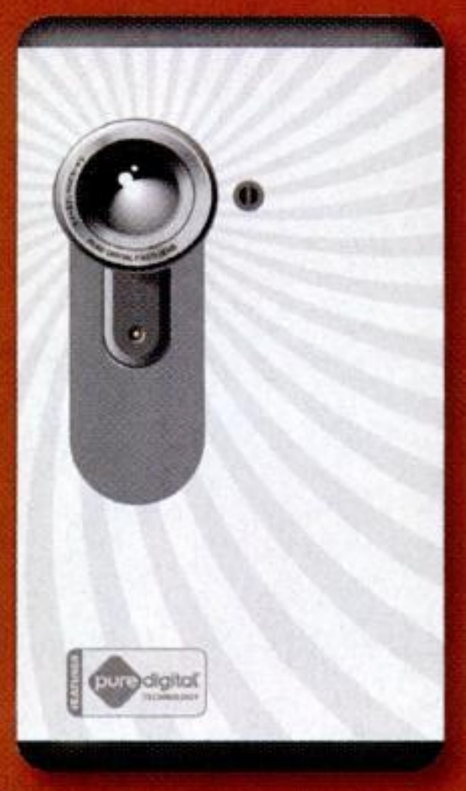
Abit, maker of easily overclocked motherboards, has pulled out of its financial nose dive by merging with Universal Scientific Industrial—a huge conglomerate that handles OEM business for IBM.

According to a press release about the transaction, Abit will continue to sell its tricked-out motherboards and other hardware, but now the company will be backed by a major player in the IT industry. We can't help but think this is good news for overclockers and PC enthusiasts.



Throwaway Digicams Arrive!

Samsung is bringing single-use digital cameras and video recorders to market, care of its ultra-cheap flash memory. Through the company's partnership with Pure Digital technologies, these disposable and recyclable cameras will sport a color LCD display and take roughly 25 pictures, thanks to 32MB of NAND flash memory. The video camera features 125MB of onboard memory.



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Seagate Ships Perpendicular

Seagate has announced the first hard drive using perpendicular recording technology—a 160GB Momentus 5400.3, which is a 2.5-inch notebook drive. Using perpendicular tech rather than conventional longitudinal recording allowed Seagate to crank up capacity 40GB over the previous-generation drive. Seagate says it plans to transition all of its drives to perpendicular tech by the end of 2006.

Watt's Up?

We hear a lot about energy vampires—devices that leech power even when they're turned off—so we plugged our trusty watt meter into a variety of common household electronics devices to find what draws the most juice.

POWER CONSUMPTION

HOME THEATER (STANDBY/PVR ON)	80W
HOME THEATER (ON)	380W
PC (OFF)	38W
PC (IDLE)	320W
PC (UNDER LOAD)	380W
PC (GAMING)	480W
SPEAKERS (IDLE)	30W
LCD MONITOR (STANDBY)	4W
LCD MONITOR (ON)	46W
12 POWER BRICKS (ASST'D)	4W

As you can see from our results, the biggest consumer of juice in our test was the gaming PC. Our dual-core SLI rig positively guzzled power during our gaming test. The other thing that surprised us was the relatively tiny amount of power that a dozen power bricks drew. At only 4W for every brick in our house, you'd be better off manually turning off your monitor, than disconnecting its source of power, if your goal is to conserve energy.

Microsoft Antivirus Won't Ship with Vista

Microsoft is clearly breathing a sigh of relief, having finally tackled all the virus problems with Windows XP.

We jest, of course, which is why news that Microsoft will not be bundling any sort of virus protection into Vista came as a mild shocker when Microsoft's Jim Allchin announced it in an interview with industry website CRN.com.

The company will, however, be bundling its anti-spyware utility—named *Windows Defender*—with Vista. The decision to omit virus protection is easier to understand when you consider Microsoft's reason. According to Microsoft, this isn't a technical decision, but rather a business decision. Instead of giving away virus protection, Microsoft will sell antivirus protection to its users via its OneCare online security service. (No, we've never heard of it either.) Microsoft will sell its OneCare Live program online and at retail, at a cost of $50 for one year. The service will protect up to three PCs.

One possible explanation for this decision is that Microsoft is hoping to avoid the ire of bigwig antivirus companies such as Symantec and McAfee, by bundling antivirus with Windows. The firms would have (rightly) raised antitrust concerns if Microsoft encroached on their turf.

Another interesting tidbit from the interview is news that Vista is now feature-complete. The OS is scheduled to arrive in time for the 2006 holiday season.

FUNSIZENEWS

ALIENWARE OPENS WEB SHOP

The Florida-based boutique PC builder recently announced an online game shop that allows you to download all of today's cool games, including *FEAR*, *King Kong*, and more. From what we can tell it's a huge store with quite a large selection, including strategy guides and gift certificates. Check it out at **http://downloads.alienware.com**.

SONY EUTHANIZES AIBO ROBOTS

Sony's Aibo, the lovable, tail-wagging robot dog that pooped AA batteries on command (we wish), has been put to sleep by its master. Sony recently announced the cancellation of the semi-popular robot dog as part of an ongoing effort to cut costs. Sony claims it sold 150,000 Aibos, which cost $2,000 a piece. It will offer support for seven years for the latest version of the plastic pooch.

XP SERVICE PACK IN THE WORKS

Just because Microsoft is prepping Vista doesn't mean the Redmond firm has completely forgotten about all its loyal XP users. According to a detailed roadmap on Microsoft's website, the company plans to release yet another Service Pack for XP Home and Pro. Here's the bad news: It's not expected to ship until the second half of 2007.

AFTER VISTA, VIENNA

Speaking of Microsoft and its OSes, the software giant has already named the successor to Vista, according to an article on News.com. Previously, the OS was named Blackcomb, but that name was recently ditched in favor of Vienna (the town, not the sausage). According to the article, Microsoft chose the name Vienna because it's a city with a great "vista." Vienna will reportedly ship with the new WinFS file system and won't require rebooting after installing new software (insert sarcasm emoticon here).

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VIRTUAL SURROUND SOUND SPEAKERS:

Head-Related Transfer Functions **vs.** Digital Audio Projection

The biggest problem with surround-sound systems is that they require wires to drive the surround channels. And if you don't want to drill holes in your walls, floors, or ceilings, you'll have to try to hide the wires along baseboards and under rugs (both to prevent a tripping hazard and to avoid destroying your room's décor). Even the so-called wireless surround-sound systems aren't truly wireless—most have power cords to drive their amps and radio receivers (and the ones we've reviewed have hissed like cornered tomcats).

After listening to a train of virtual surround-sound systems that couldn't come close to duplicating a true 5.1-channel speaker system, we'd pretty much dismissed the notion of producing surround sound using a single speaker enclosure. But after publishing a White Paper on digital audio projection (DAP) in October 2005, and then one on head-related transfer functions (HRTFs) in January 2006, we decided to give technology another chance. We chose Cambridge SoundWorks' $1,000 SurroundWorks 200 Virtual Home Theater System to represent HRTF technology and pitted it against Yamaha's $900 YSP-800 digital audio projector.

BY MICHAEL **BROWN**

DIGITAL AUDIO PROJECTOR:
Yamaha YSP-800, $900,
www.yamaha.com

round 1 SEX APPEAL

The YSP-800 DAP arouses instant techno-lust, sporting 21 (that's *twenty-one*) 1.62-inch drivers inside its all-steel enclosure, plus two 3.94-inch midranges. Each of the smaller drivers is powered by a discrete 2-watt amplifier, and each mid is paired with a 20-watt amp. DSP algorithms create five distinct sound beams that reflect off the room's walls and ceiling, tricking your brain into believing that the sounds are originating all around you.

HRTFs are basically filters that use psychoacoustic tricks to position virtual sound sources around your head. Because they don't require large speaker arrays, these systems don't look as sexy as DAP components. The SurroundWorks 200 consists of three 2.78-inch full-range drivers, supplemented by a subwoofer. An amp supplies 50 watts to each satellite and 75 watts to a 6.5-inch sub. **WINNER: DAP**

round 2 MUSIC

The vast majority of music that most of us listen to is recorded in conventional stereo, so it's crucial that a surround-sound system provide excellent channel separation without leaving a big hole in the middle. Both systems proved adept at creating satisfyingly broad, yet well-defined soundstages with generous sweet spots. We were equally content with both technologies when it came to surround-sound music recordings. Both the HRTF and the DAP systems made us feel as though we were right onstage in the midst of the performers. It is vital, however, that the Yamaha system be mated with a carefully chosen powered subwoofer—the system by itself has no bottom-end to speak of. (We tested it with a Boston Acoustics PV-800.) **WINNER: TIE**

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round 3 MOVIES AND GAMES

The HRTFs in the SurroundWorks 200 did an absolutely amazing job of fooling our ears—as long as we didn't turn our heads. And that's the insurmountable problem with head-related transfer functions: they rely on your head being in a predictable position.

With a digital audio projector, turning your head results in an *appropriate* change in perception. If the sound bounces off the rear wall to your right, for example, and you turn your head to the left, the delay before the sound reaches your right ear drum will increase slightly—just as it should. But here's an important caveat: Because neither of these systems has six analog audio inputs, connecting either to an analog PC soundcard will require a digital encoder, such as Creative's Home Theater DTS-610. **WINNER: DAP**

round 4 VERSATILITY

This round reflects more on these specific HRTF and DAP solutions than it does on the technologies in general. The SurroundWorks 200 comes complete with an A/V preamplifier, an AM/FM tuner, and a progressive-scan DVD player. It can decode Dolby Digital 5.1, DTS 5.1, and Dolby Pro Logic II (music and movie modes). It can play DVD-Audio discs, but not SuperAudio CDs.

The YSP-800 is an amplifier and speaker system only. It will decode Dolby Digital 5.1, Dolby Pro Logic, Dolby Pro Logic II (music, movie, and game modes), DTS 5.1, and DTS Neo:6 (music and cinema modes). It cannot be paired with a DVD-Audio or SuperAudio CD player. While HRTF technology can be implemented in both loudspeakers *and* headphones, DAP is a speaker-only technology. **WINNER: HRTF**

round 5 PRICE/PERFORMANCE RATIO

A digital audio projector accomplishes its magic using a powerful DSP chip and an array of small, individually amplified speakers. As we've learned, Yamaha's YSP-800 uses 23 drivers powered by 23 separate amps, and Yamaha recommends—and we consider it an absolute a necessity—that the system be paired with a powered subwoofer. This increased complexity is reflected in the price of the system.

HRTF systems also rely on a strong DSP, but they don't require as many loudspeakers. In fact, the SurroundWorks 200 uses just three drivers in its main speaker unit, and it comes with a perfectly matched powered subwoofer. This lower component cost enabled Cambridge SoundWorks to build an all-in-one home-theater system that costs less than a YSP-800 plus subwoofer. **WINNER: HRTF**

HEAD RELATED TRANSFER FUNCTION:
Cambridge SoundWorks SurroundWorks 200, $1,000, www.cambridgesoundworks.com

And the Winner Is...

If you'd have told us six months ago that we'd be waxing enthusiastic over any virtual surround-sound system, we would have politely suggested a visit to your local psychotherapist. But based on our experience with head-related transfer functions as implemented in Cambridge SoundWorks' SurroundWorks 200, and with digital audio projection as executed by Yamaha's YSP-800, we're of a very different mindset.

We're not quite ready to give up on discrete 5.1-, 6.1-, or 7.1-channel speaker arrays, but Cambridge SoundWorks and Yamaha have finally made us believers in virtual surround sound. Yes folks, it's a tie: If you find wiring up surround speakers too impossible or impractical (please, just say "no" to wireless), HRTFs and DAP really do offer an effective alternative.

It's important to note, however, that not all virtual surround-sound systems are created equal. Yamaha is the only company offering a reasonably priced digital audio projector today, but other companies are sure to follow if Yamaha gains traction (and many of these are sure to sound like crap). There are already a number of devices on the market that promise to deliver effective virtual surround sound through the use of HRTF technology, but the SurroundWorks 200 joins Sony's phenomenal MDR-DS8000 headphones (reviewed in the January 2006 issue) as the only ones we've heard that aren't bunk. MPC

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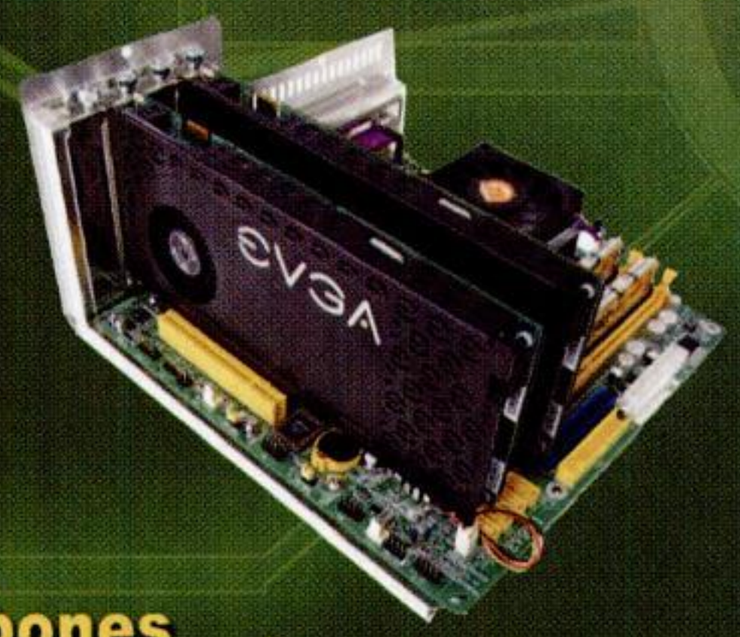

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Macintosh, Watchdog of the month

Our consumer advocate investigates...

✓Sony Rootkit ✓XP RAM Limits ✓Newegg Ad Errors ✓Squealing Dell

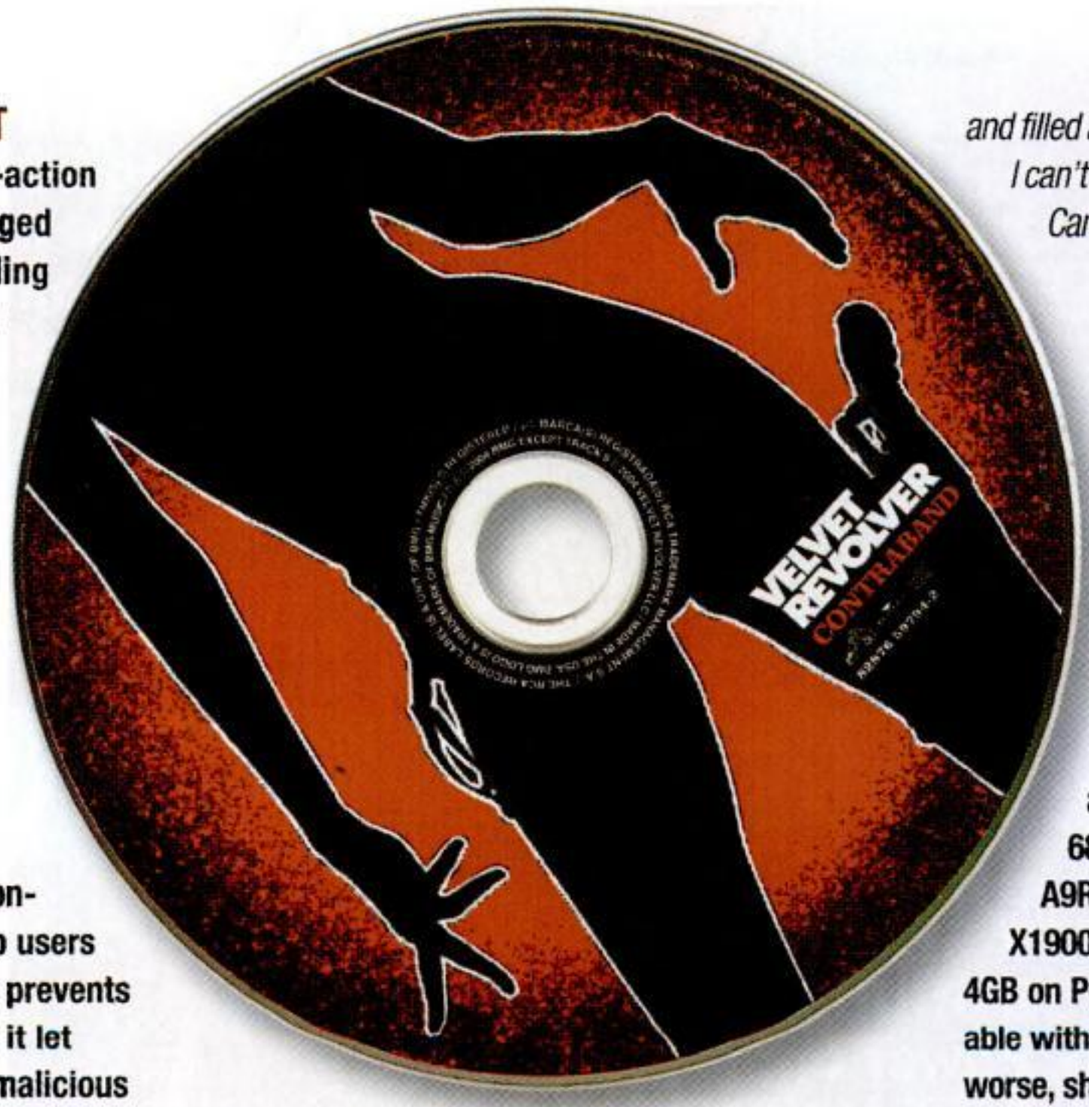
SONY BMG SETTLES ROOTKIT SUIT

Sony BMG has agreed to settle a class-action lawsuit that alleged the company engaged in deceptive conduct by secretly installing digital rights management software on people's computers.

Sony BMG found itself in a crap-storm of trouble when programmer Mark Russinovich discovered that Sony was including a rootkit in its CDs. Album's such as Celine Deion's *On Ne Change Pas,* Neil Diamond's *12 Songs,* and Gerry Mulligan's *Jeru,* among many others, contained the rootkit. When consumers inserted one of these audio CDs in a PC, the rootkit would automatically install. A rootkit is software that helps conceal processes in an operating system so users are unable to detect them. Sony's rootkit prevents users from copying its CDs, but a flaw in it let hackers exploit its features to also hide malicious software. Sony used three different copy protection schemes on its CDs, so the settlement will vary depending on the scheme.

Consumers with XCP protection can receive $7.50 in a check or debit card and a free album download from a specified list, or three free album downloads. That consumer will also be entitled to download the original album he or she purchased from any of three major download services, within 180 days. The original CD must have been purchased before February 1, 2006. As part of the deal, the consumer must also provide proof that the original CD was returned to the store where it was purchased, and run a Sony update of the XCP software that removes the security holes.

Consumers who purchase CDs with *MediaMax 3.0* software before December 31, 2006 (these CDs are still on store shelves), are eligible for an MP3 download of the CD. Consumers who purchase albums with the newer *MediaMax 5.0* before December 31, 2006, are eligible to receive an MP3 download of the album as well as one additional album download from a list of 200 albums in the Sony BMG catalog. Consumers with either version of *MediaMax* must submit the original UPC code, a purchase receipt (which can be an electronic receipt), or a credit card or bank statement showing the purchase. For more information on the settlement visit www.girardgibbs.com/sonysummary.asp. See the websites below to find out what copy-protection scheme is on your CDs:



This Velvet Revolver CD contains software that prevents people from copying the disc and potentially leaves your PC open to hacking.

►Albums with XCP protection: http://cp.sonybmg.com/xcp/english/titles.html

►Albums with MediaMax 5.0: www.eff.org/IP/DRM/SonyBMG/settlement_faq.php#3

►Albums with MediaMax 3.0: www.eff.org/IP/DRM/Sony-BMG/mm_3.0_titles.php

WHOSE FAULT IS IT? WINDOWS, OF COURSE

I bought an A8N-SLI Deluxe motherboard from Asus, because ***Maximum PC*** *praised it so highly. Asus advertised it as supporting 4GB of memory, so I bit the bullet and filled all four slots with 1GB DIMMS. But in Windows, I can't get more than 3.5GB. I find this unacceptable. Can you shed some light on the matter?*

— Dan Lins

Dan was one of several readers to recently hit the dreaded 4GB limit on their PCs. Another reader reported seeing only 3GB of his 4GB in Windows XP, on his Abit AV8. The problem isn't that the motherboard or chipset companies are failing to meet the specs they publish, it's the OS. In other words, blame XP.

The Dog installed 4GB of RAM in both an Asus A8N-SLI Deluxe running a pair of 6800 GS cards in SLI and a Sapphire PC-A9RD480 motherboard with a single Radeon X1900 XTX card. Both boards identified a total of 4GB on POST, but in Windows, only 3GB was available with the Sapphire board. The SLI system fared worse, showing just 2GB of RAM available.

The problem lies with how Windows XP allocates physical address space for devices. For more details we asked Asus to explain: "As you know, Windows XP is a 32-bit operating system and has a total of 4GB in memory space. Hardware devices will take I/O address resources from this 4GB. For example, the 3.75GB~4GB (256MB) memory space is reserved for I/O APIC and BIOS EPROM; 3.5GB~3.75GB is reserved for configuration-space memory-mapping access for PCI Express; 3.25GB~3.5GB is reserved for PCI bridge devices such as the IDE Controller, USB devices, and onboard audio. When you have a PCI Express graphics card with 256MB of RAM, 3GB~3.25GB will be allocated to the first PCI Express graphic card. A second PCI-E card would take another 256MB in the 2.7GB~3GB range. That's the reason you might see 2.75GB [out of 4GB] of memory available for Windows application."

The Asus spokesman said memory remapping could be a solution, but there's a perfor-

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com.** The Dog promises to answer as many letters as possible, but only has four paws to work with.

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mance cost, and some drivers might fail with the physical address extension enabled. The company said it expects the next generation of OSes to correct the problem. If you really want access to all 4GB now, the Dog offers this option: Windows x86-64 Edition will let you run all 4GB of RAM (and more for other motherboards).

OOPS, I DID IT AGAIN

Not more than 10 minutes after reading the March Watchdog column with Newegg's response to the "error" in its camera ad, did I turn the page to find the Canon Digital Rebel XT being advertised by Newegg for $563! I tried to order it online and by phone and was told it was also an "error." That is two errors in three issues. If Newegg isn't being underhanded, it is at the very least incompetent. Either of these reasons is enough for me to spend my money elsewhere.

— Jim B.

Jim was the first of numerous readers to report the discrepancy in the March issue. Newegg's ad claimed to sell the Canon Digital Rebel XT for $563.99—about $335 less than what the camera normally sells for. The Dog went back to Newegg veep Howard Tong, who told the Dog: "Newegg again sincerely apologizes for the pricing error. The recent mistakes in advertisements featured in the magazine were the result of an issue in our advertising process. We have corrected this issue and no further problems should arise. Unfortunately, the March advertisement went in before we had completed the audit and made all the needed corrections to our ad creation process. For readers' troubles, we would again like to extend a deal on the incorrectly priced camera in question. We will continue to offer the black 8MP Canon Digital Rebel XT with EF-S 18-55mm lens for an at-cost price to us of $889.99 (as it is currently listed on our site), with free shipping. We will also provide a $25 discount on this camera, good through June 2006. Please ask *Maximum PC* readers to contact us directly at service@newegg.com so we may assist them with this offer."

As Scotty said in episode 32: "Fool me once, shame on you, fool me twice shame on you." The upshot is that Newegg has been quite responsive to the Dog's questions and while the second typo and its timing are odd, the Dog thinks Newegg deserves another chance. That, however, doesn't mean we won't be watching. Woof.

XTREMELY OLD SPEAKERS

*I recently purchased a Creative Sound Blaster X-Fi Xtreme Music card after **Maximum PC's** nonstop bragging about the new product line. I checked to make sure the X-Fi supported 4.1 speakers and it states that it does on the website. Upon installation of the soundcard, I quickly discovered there was a problem with the Creative FPS2000 speakers I own. All Creative tech support could tell me is that Creative soundcards do not support all Creative speakers. Is there a fix for this? If I am forced to buy new speakers, do I buy Creative or Logitech?*

— Garland R. Lym

The Dog pinged a Creative official who told him: "The digital connectivity on our soundcards has changed such that the particular speaker system you have mentioned, which we introduced about seven years ago, does not connect through the digital din to the X-Fi. Changing the connectivity enables us to put in the A-D link for connecting to the breakout box and the FlexiJack connector while still providing the analog mic/line-in that works without needing the breakout box. Without the din, users should still be able to connect via analog."

Garland, you're sadly a victim of progress.

The FPS2000 set was part of Creative's push for digital speakers on the PC. Creative ultimately gave up and these speakers (and a few other models) are now like a human appendix. Because you have the soundcard, your option is to run the FPS2000 in stereo analog mode or simply dump the speakers for something newer. Because you're probably steamed at Creative over the obsolescence of your FPS2000 set, the Dog thinks you'd probably get some satisfaction by buying a pair of Logitech speakers, such as the lovely Z-5500.

Readers say there's no squeal problem with Dell's 2405FPW.

NO WHINING

A spate of online chatter regarding the Dell 2405FPW LCD prompted the Dog to call for reader input in the February issue. He wondered whether owners of the 24-inch widescreen were experiencing a high-pitched squeal or whine that Dell was unable to fix? After a month of email, the vast majority of readers reported that their monitors are free of any whining problems (although a few had other issues with the LCD and Dell's service). MPC

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Today things are different. Thanks to industry-wide digital-rights-management (DRM) schemes, the music you purchase can't be copied to your MP3 player or PDA. And that DVD

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you just bought? Don't even think about copying it to your laptop—unless you want to risk 10 years at Leavenworth with Romper Stomper and his cronies. We think the whole thing is bunk. The ridiculous limitations do nothing to protect content owners from piracy; they only inconvenience the people who actually pay for their products!

Luckily, it's a snap to de-DRM most modern media, and we'll tell you everything you need to know to do it yourself. We'll tell you what's legal, what's illegal, and how to thoroughly take control of your digital media! Let's get to it!

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Digital Media Q&A

WHY DO I NEED THIS GUIDE?

Whether you have kids who like to watch *The Little Mermaid* while eating peanut butter and jelly, or you just want to enjoy a Velvet Revolver track on your iPod, there are hundreds of legitimate reasons an honest consumer would want to copy or convert his movies and music. Unfortunately, because of a legal loophole, even innocent acts can be illegal.

The problem is the Digital Millennium Copyright Act (DMCA), which Congress passed in 1998. This atrocious piece of legislation makes it illegal to circumvent encryption on copyrighted material. As just about all commercial DVDs, and a significant number of commercial CDs, are encrypted, it's thus illegal to convert a DVD movie to a format that works on your portable video player, remove DRM from a track you purchased at the iTunes Music store to play on your Creative Muvo, or even rip some CDs to MP3.

IS IT EVER LEGAL TO DE-DRM MY MEDIA?

If you have to bypass any kind of encryption scheme to copy your tracks, you're violating the law as set forth in the DMCA. However, as long as you don't take the de-DRM'd content and distribute it, it's extremely unlikely you'll actually be caught and prosecuted.

WHY ARE HARDWARE VENDORS ONBOARD WITH DRM?

It's simple: If you buy music from the iTunes Music Store, which only plays on Apple's iPods, are you going to buy a Microsoft-backed PlaysForSure music player, which can't play iTunes music, or an iPod, which can? By crippling your media with DRM, hardware vendors marry their consumers to one hardware platform—theirs.

WHAT IS DRM?

DRM stands for digital rights management, which is basically a fancy way for content producers to limit the way consumers can use different types of media even after it's purchased! Content providers argue that DRM helps prevent piracy, but we don't buy that. Because workarounds have been found for virtually every DRM technology out there, DRM doesn't slow piracy. All it does is make it difficult for you, the consumer, to exercising your fair-use right, by preventing you from ripping a CD, or converting a DVD for playback on your PSP.

WHAT IS 'FAIR USE'?

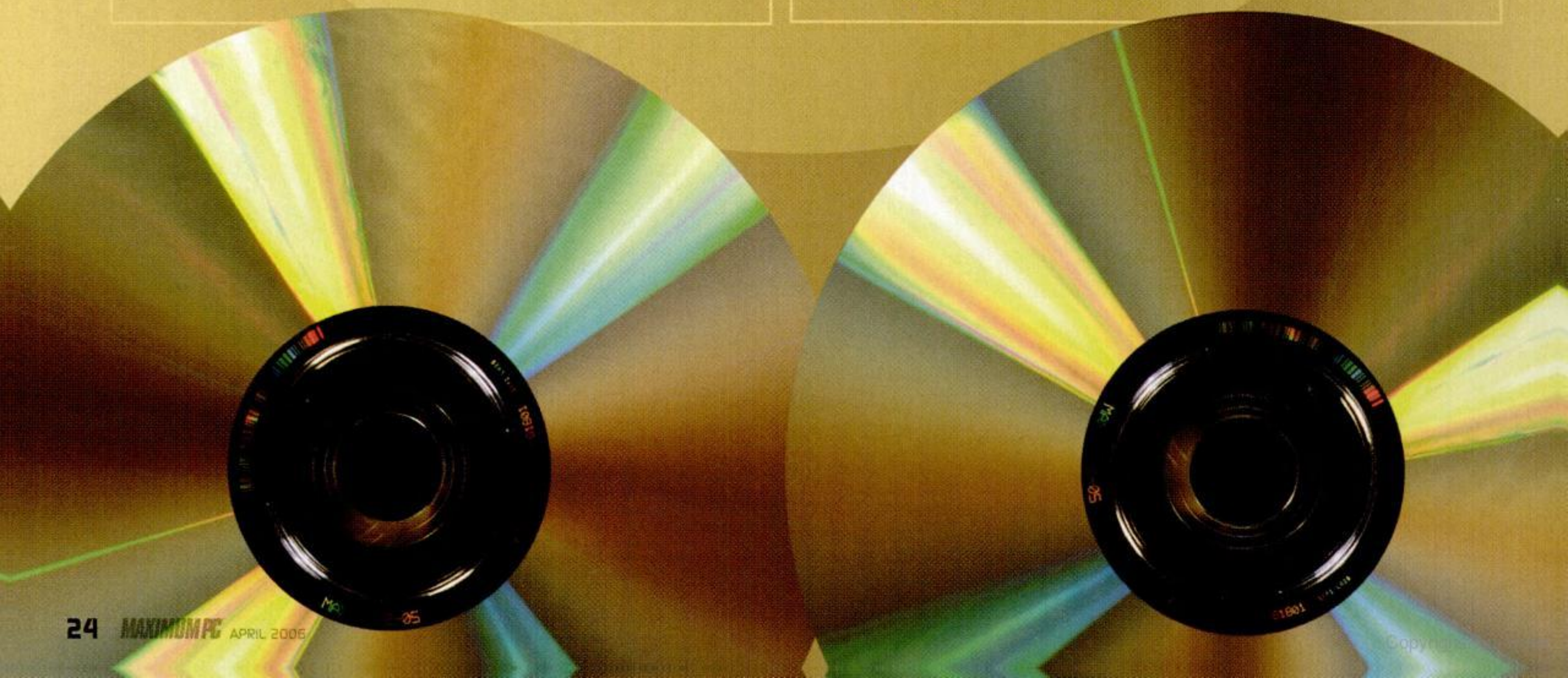
Fair use is an aspect of United States copyright law that allows people to copy and reuse copyrighted material for certain protected uses—including personal use. The doctrine of fair use basically allows you to make backup copies, or even transfer content from one medium to another, as long as it's for your own personal use.

Of course, there's a catch. If you have to bypass a protection scheme in order to exercise your fair-use rights, you'll be in violation of the DMCA. It's quite the gnarly loophole, isn't it?

WHAT CAN I DO?

It's relatively easy to bypass most current DRM technologies. You can either remove the encryption using a special utility, or if that doesn't work, record the unprotected analog output before it leaves your computer.

As for the larger picture, you need to write to your representatives in Congress and let them know that you don't take kindly to DRM technologies that prevent you from doing something you've been able to do in the past. Don't buy products that include crippling DRM—that means no downloadable music and no protected CDs (see page 32 for more on "protected" CDs). And don't hesitate to return CDs and movies that include DRM technology if you accidentally buy them!



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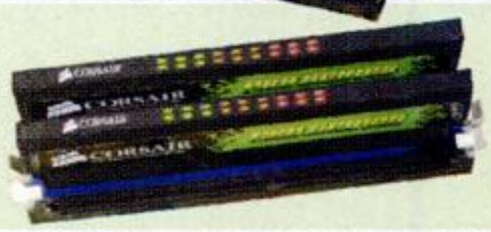

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Back Up Your DVDS

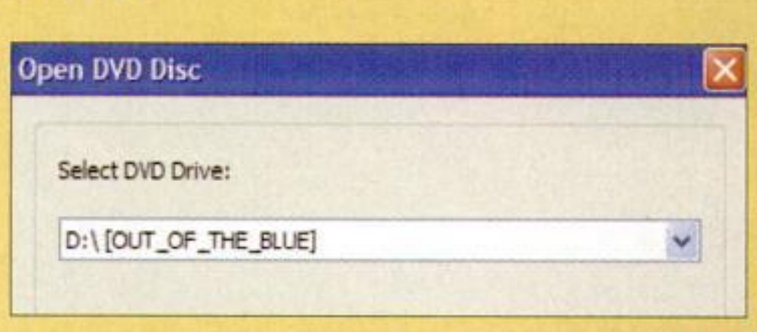
WHAT YOU'LL NEED

- DVD Shrink (free, www.dvdshrink.org)
- The DVD you want to copy
- A blank DVD disc

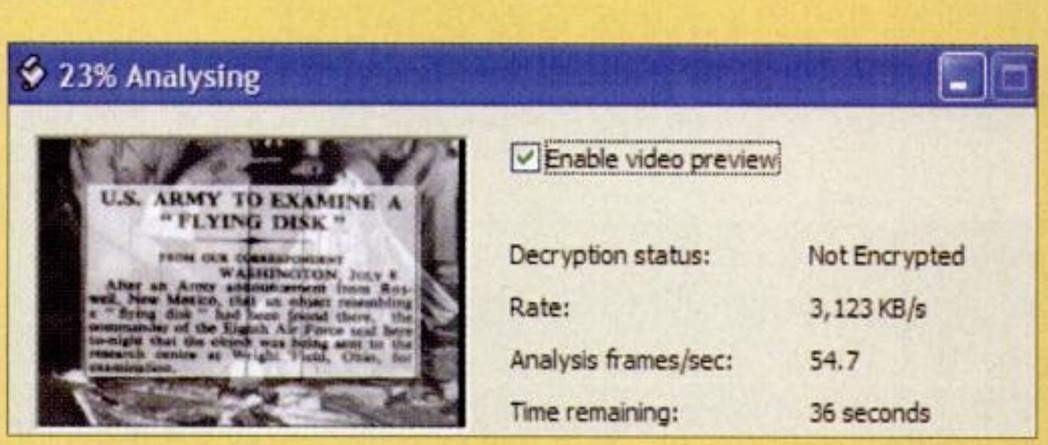
Kids and optical discs don't mix. For that matter, neither do adults and optical discs. Ever since we left a folder full of DVD discs in an airline seat pocket, we carry dupes of our DVDs on the plane, instead of the originals. The easiest way to back up a DVD is with *DVD Shrink*. Even though the application is still freely available (just search Google), it's no longer supported by its author. This freeware utility compresses a standard dual-layer DVD down to 4.35GB, allowing you to burn the contents to a single single-layer DVD disc. It will even decrypt encrypted DVDs for you.

STEP1 OPEN THE DISC

After inserting the disc and starting the application, click "Open Disc," and then OK.

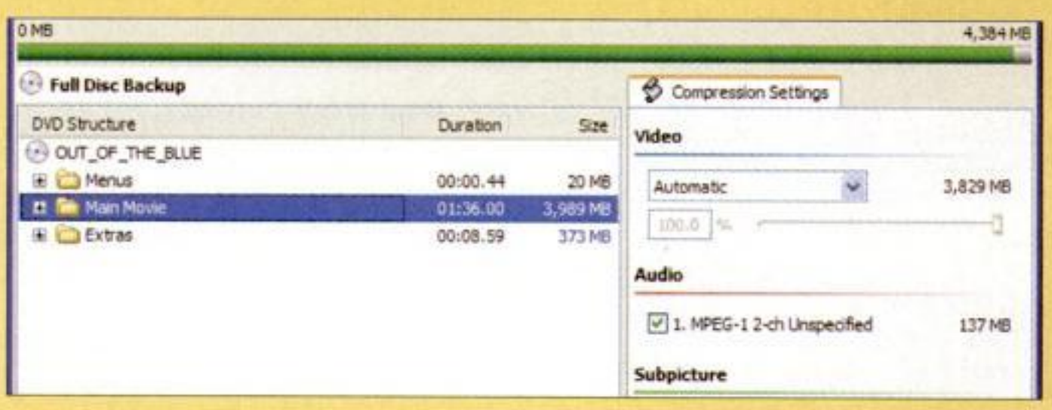


STEP2 ANALYZE THE DISC



In this phase, *DVD Shrink* analyzes the disc's contents to determine whether the movie is encrypted, and it catalogs the contents of the disc.

STEP3 EXAMINE YOUR OPTIONS

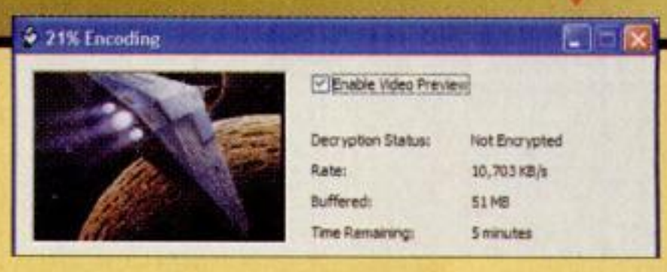


Once DVD Shrink finishes analyzing the disc, it will show you all of the audio and video streams present. You should uncheck any streams you won't need, such as French subtitles and the trailers for coming attractions. Our test disc is pretty bare-bones, so there's nothing we need to remove. Click "Backup" to continue.

STEP4 BACK IT UP

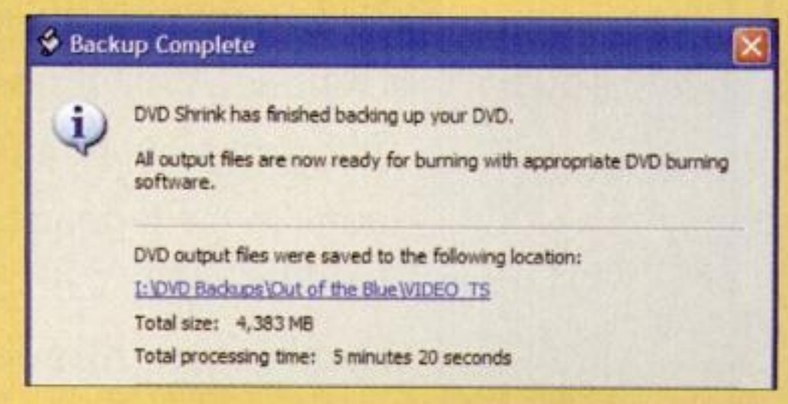
Now we need to tell *DVD Shrink* where to save the ripped DVD. Be sure to check "Create VIDEO_TS and AUDIO_TS subfolders" in order to make the burning process easier. Click "OK" to begin the backup process.

STEP5 LET 'ER RIP



Now *DVD Shrink* copies the contents of the DVD to your hard drive, and recompresses the video content so that it will fit on a single-layer disc. The time it takes to complete this phase boils down to two things: your optical drive's speed and your CPU's sheer processing power. Because *DVD Shrink* is multithreaded, it can take full advantage of dual-core processors and complete the transcode in half the time it takes a comparable single-core system.

STEP6 YOU'RE DONE



You're all done. The files have been copied to the predetermined destination. Now just fire up your DVD burning app, tell it you want to burn a DVD video disc, drag the "VIDEO_TS" folder into your burning utility, and fire away. Your DVD is now safe from the clutches of the unruliest infant.

WHAT OTHER SOFTWARE CAN I USE?

DVD Shrink is freeware, and as such, is quite limited. There are several utilities for purchase that offer a lot more flexibility and features, including: *Nero Recode, AnyDVD, Intervideo DVD Copy 4, DVD Decrypter,* and *#1 DVD Ripper.*

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Ripping and Compressing DVDs

WHAT YOU'LL NEED

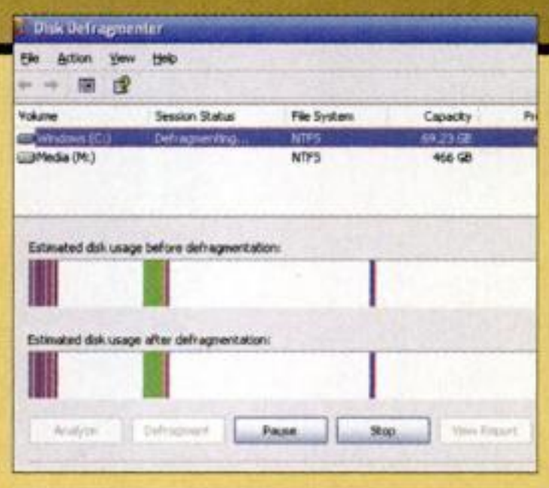
- A DVD you want to rip
- DVD Copy 4 Gold ($50, www.intervideo.com)
- AnyDVD (optional, $40, www.slysoft.com)
- 1- to 2GB of hard-disk space per DVD

Copying DVDs is great, but we love to re-encode our DVDs, using much better compression so they're suitable for playback on computers, Media Centers, and even TVs equipped with a video streaming box. What's better, once your video is in a standard format, it's a cinch to tweak it to play on a Video iPod, PSP, or portable video player.

Ripping DVDs has always been pretty easy; there are dozens of freeware apps that will decrypt the disc and copy VOB files to your hard drive. However, actually doing anything with those mystical VOB files—like transcoding them to smaller Divx or WMV files—is often an insanely difficult, multi-step process.

Intervideo's *DVD Copy 4* will rip to every format we've ever needed, in three easy steps, but it won't rip any encrypted DVDs. For that, you'll need to pair *DVD Copy* 4 with *AnyDVD,* which removes the copy protection and region encoding from your DVDs on the fly.

STEP1 PREPARATION



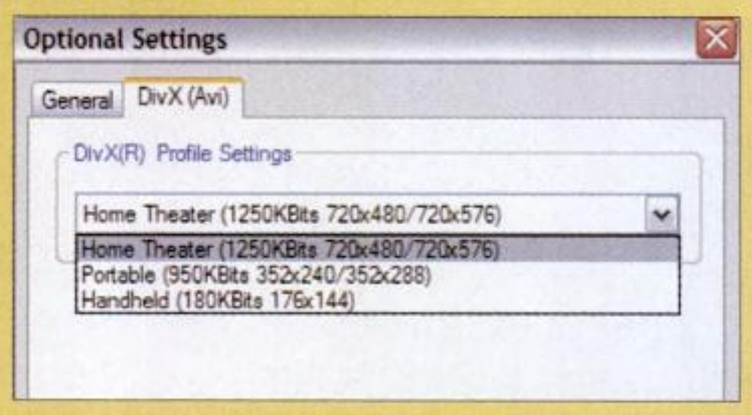
We're going to assume that you've already installed the software—including *AnyDVD* if you're going to rip encrypted discs—and you're now wondering what you need to do to prepare for the rip. First, make sure you have enough free disk space on a drive formatted with NTFS. Each movie will absorb about 2GB at DVD-quality bitrates. Before you begin, defrag your drive, and you're ready to go.

STEP2 CHOOSE YOUR SETTINGS

Open up *DVD Copy* and drop your DVD in the drive, if you haven't already. Make sure your source and target are set correctly in *DVD Copy:* Point the source at your DVD drive, and select a Target folder to save the ripped movie in.

In the "Copy As" field, you'll be able to choose from a variety of formats—including Divx, WMV, straight MPEG-4, and H.264 (if you shelled out for the Platinum Edition). We're going to use Divx(Avi), but check the sidebar below for more on the different formats.

STEP3 TWEAK THE CODEC



Click the little hammer icon on the right side of the screen to make a couple of small tweaks. You'll want to change the "Disc Label" to the name of the movie, and then you should click the Codec tab (it's Divx here) to change the resolution.

Although some codecs offer more options, Divx is minimal. For most DVD rips, you'll want to use the Home Theater profile. It will deliver a near-DVD quality file, at about a quarter of the space used on a commercial DVD.

STEP4 RIP IT

All that's left now is to select the content to rip. For movies, you can usually click Main Movie, which selects the longest video on the disc. If you're ripping a disc of TV shows, you might have to manually select the titles you want using the Customize button.

After you've chosen the Titles and Chapters to rip, all you have to do is press the Rip button in the lower-right corner of the screen and wait. Rip times will vary based on the speed of your optical drive and CPU. The encoders are all multithreaded, so dual-core processors are much faster than comparable single-core procs.

CODEC PRO AND CONS

There are reasons to use each of the available codecs—some work nearly everywhere, while some deliver exemplary compression and video quality. Here's a quick rundown on five options that *DVD Copy 4 Platinum* offers.

DIVX The new Divx 6 container format allows multiple audio streams, subtitles, and even multiple videos inside a single file. It's essentially a one-file DVD. However, it's not widely supported yet.

DIVX (AVI) The original MPEG-4-based Divx format. If you want a file that will play virtually anywhere, with decent quality and sound, this is it.

WMV The choice for owners of Windows Media Center machines. WMV offers better compression than Divx, but isn't as widely supported. It's the only format supported by Windows Media Center Extender streaming boxes.

MP4 The official MPEG-4 format is MP4. Many portable players support MP4, including the PSP and Video iPod.

H.264 A new addition to the MPEG-4 standard. H.264 allows for greatly improved image quality at even smaller sizes than standard MP4 files. Lacks wide compatibility with streaming boxes, but is supported on many portable players.

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Take Your Video on the Road

Now that you've managed to convert a DVD movie into a Divx file, the hard work is done. Converting from Divx to virtually any other format is a snap, if you have the right tools.

CONVERTING FOR THE PLAYSTATION PORTABLE

PSP Video 9 is an über-handy piece of software. Not only will it convert video files to play on your PSP, it will even manage large collections, helping you move movies on and off your PSP's storage card as you need space.

Download and install the app, and you're ready to get started. *PSP Video 9* includes tons of customization options, but it works pretty damn well out of the box. Click the Convert button, select One-Click Transcode, point the app to the movie you want to transcode, and come back in a few hours.

Once the transcode has completed, plug your PSP into the PC and set it to use the USB connection. Then go to *PSP Video 9's* Copy tab, select the videos you want to copy to your PSP, and click Copy Video to PSP.

WHAT YOU'LL NEED

- A Divx movie
- PSP Video 9 (donateware, www.pspvideo9.com)
- A Memory Stick Pro Duo 512MB or larger

COVERTING FOR THE VIDEO IPOD

This one's pretty simple. Download and install Videora iPod Converter, then run the program. Click Setup, then point the "Output videos to" setting to someplace that will be easy to find: We recommend My Documents\My Videos\iPod Videos. Then click the Convert tab, select One-Click Transcode, and point *Videora* to the file you want to convert. When it's done, you can drag-and-drop the file into *iTunes*, and configure *iTunes* to sync the file manually.

WHAT YOU'LL NEED

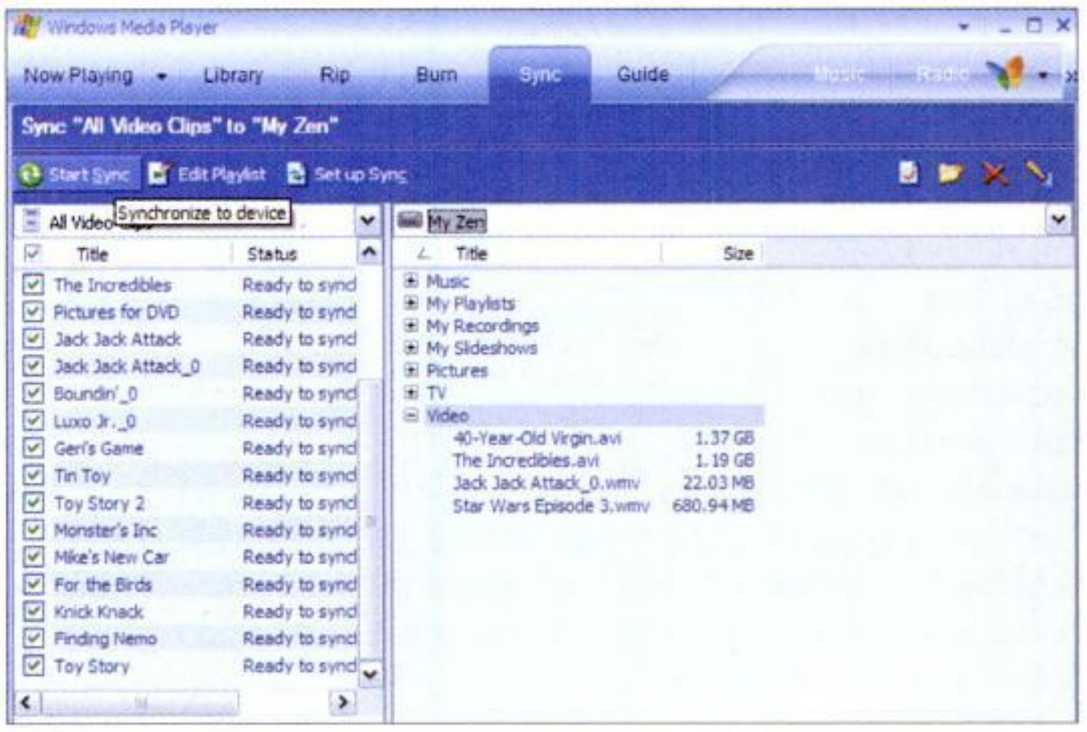
- A Divx movie
- Videora's iPod Converter (donateware, www.videora.com)

CONVERTING FOR PORTABLE MEDIA PLAYERS

Virtually all of the portable media players available today can be loaded using *Windows Media Player 10*. In fact, *Media Player* can even convert your movies to formats that your player supports. All you need to do is connect your player, open *Windows Media Player*, and go to the Sync tab. Click Edit Playlist and select the videos you want to add, or drag any movies you want to move to your player into the list window. When you're ready to start the sync and conversion process, press Start Sync. That's all there is to it!

WHAT YOU'LL NEED

- A Divx movie
- Windows Media Player 10 (free, www.microsoft.com)



Rip Perfect MP3s

WHAT YOU'LL NEED

- An audio CD
- Exact Audio Copy (free, www.exactaudiocopy.de)
- LAME encoder (free, http://mitiok.cjb.net)

Do you listen to audio CDs in your CD-ROM drive, or carry a portable CD player while you jog? Of course not. You rip your audio CDs to MP3, and then transfer the files to your hard drive, your MP3 player, and your laptop. Because ripping audio files is quite pedestrian these days, you probably know how to do it. But do you know how to do it the *Maximum PC* way? Here's how to rip audio files so they'll sound as good as uncompressed WAV files.

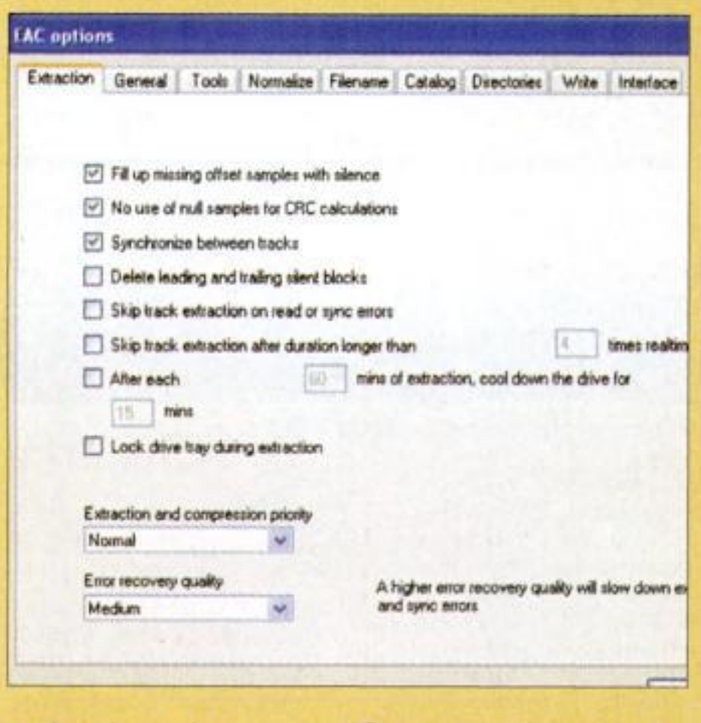
STEP1 DOWNLOAD EAC AND LAME

Exact Audio Copy is our favorite tool for ripping audio CDs because it's dead accurate, produces flawless rips, and warns you of the presence of potential problems—think skips, clicks, or pops. It's not the fastest solution, but we'll trade accuracy for speed every time. Download *EAC*. Next, download the open-source *LAME MP3* encoder, so you can encode your ripped files. Unzip both programs into the same folder on your hard drive.

STEP2 INSTALL EAC

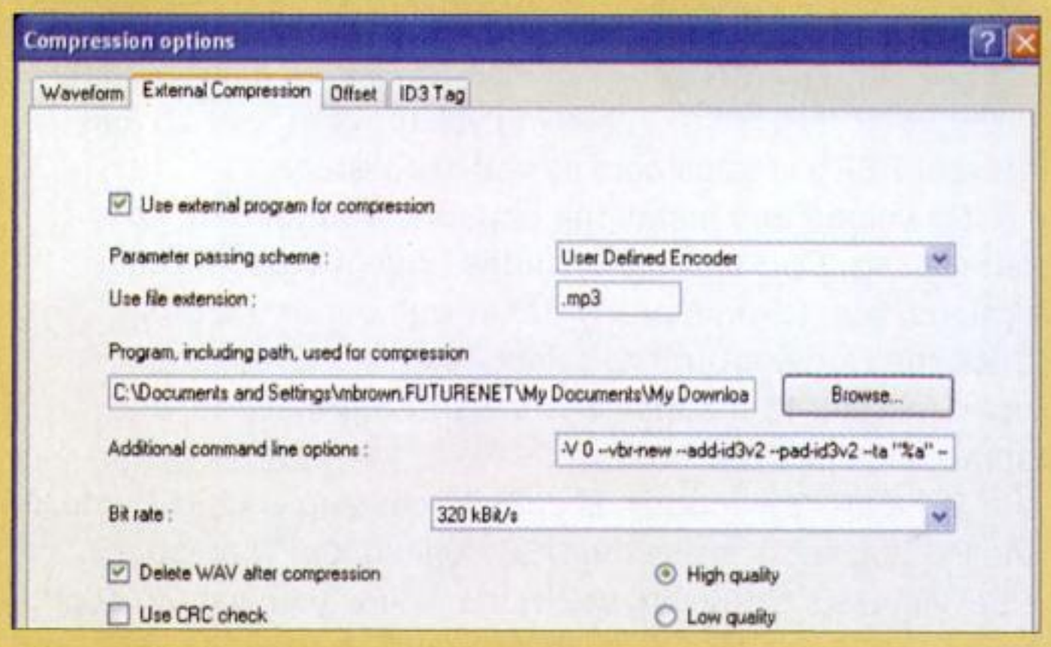
EAC's setup wizard will automatically start when you install the program. Choose the option "I prefer to have accurate results." Skip the step to install and configure *LAME* by removing the checkmark—we'll install it later. You have to enter an email address in the next screen to gain access to the Freedb CD database, which will automatically populate your MP3s with artist, album, and track-name info. Choose the option labeled "I'm an expert…" and click Finish.

STEP3 CONFIGURE EAC



Choose "EAC options" from the *EAC* menu. Deselect the option labeled "Lock drive tray…," so you can open the drive tray should *EAC* hang on a scratched CD. Leave the other options at their defaults. Click the Tools tab and place a checkmark next to "On extraction, start external compressors…" (*EAC* will read the next track while the compressor is working on the previous track, speeding up the ripping process). Click OK.

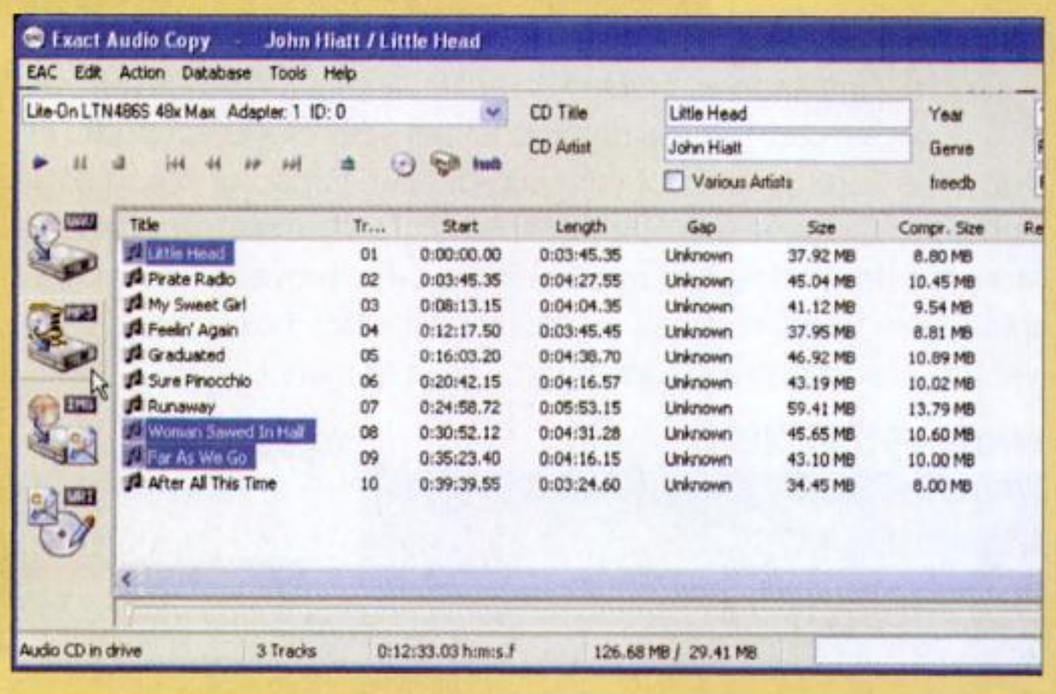
STEP4 DOWNLOAD EAC AND LAME



Choose "Compression options" from the *EAC* menu and click the External Compression tab. Place a checkmark next to "Use external program for compression," choose "Use Defined Encoder" from the drop-down menu, browse to the folder where you downloaded *LAME*, and click lame.exe. We're going to encode our MP3s using variable bit rate (*VBR*), and we want *LAME* to write metadata (artist, track title, etc.) to the ID3 tags, so type this exact text into the "Additional command line options" field: `-V 2 --vbr-new --add-id3v2 --pad-id3v2 --ta "%a" --tt "%t" --tl "%g" --ty "%y" --tn "%n" %s %d` Ignore the rest of the options here, but click the ID3 Tag tab and remove any checkmarks. Click OK.

STEP5 CONFIGURE EAC

Now you're ready to start ripping. Drop a CD into your optical drive and give *EAC* a moment to download information about it from Freedb. In the main *EAC* window, choose the tracks you wish to rip and then click the MP3 icon in the vertical toolbar. Browse to the folder where you want the files stored and click Save.



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2K Games recommends NVIDIA graphics processors for Serious Sam II.

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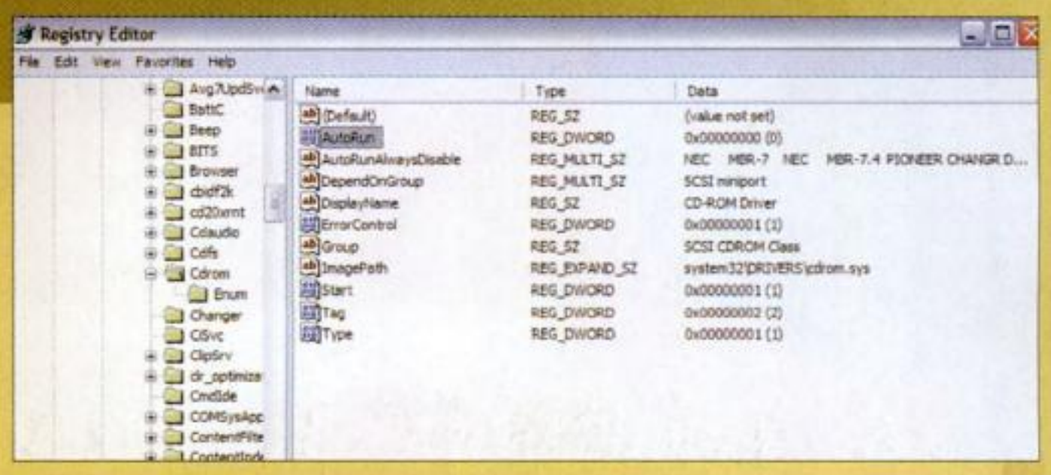
Rip Copy-Protected CDs

Because the CD-ROM was designed more than 20 years ago, when encrypting the contents of a 700MB disc was impractical, the contents of music CDs must remain unencrypted and unencumbered by DRM, if the music industry expects new CDs to work in the billions of CD players sold in the last 20 years. That makes ripping "protected" CDs much easier than even ripping a DVD.



Disabling Autorun is the easiest way to ensure that you'll be able to convert your purchased CDs to MP3s.

Autorun is the Enemy

This might sound ridiculous, but the easiest way to make sure you can rip any CD is to disable autorun on your optical drive. Most commercial CD protection software relies on driver tricks or a resident application to confuzzle your music ripping app, but that software has to be installed somehow, right? Right. It's installed automatically—you insert a disc and the autorun file tells your PC to run the installer.

Disabling autorun is simple, but it will disable the functionality for all users of your machine, and for all discs. It means that no software installers will automatically start anymore. If that's not an acceptable option, then you can temporarily disable autorun anytime you insert a disc, by holding down the Shift key until the drive is fully spun up.

To permanently disable autorun, you need to edit the Registry. The usual warnings apply: Failure to properly follow our instructions could result in a broken Windows install, computer instability.

Open regedit by going to Start, then Run, and typing regedit. Press Enter. Then browse down to HKEY_LOCAL_MACHINE/SYSTEM/CurrentControlSet/Services/Cdrom. Open the AutoRun value, and change it from 1 to 0. The next time you restart your computer, autorun will be disabled, and you'll be able to rip nearly anything you like.

If Disabling Autorun Doesn't Work

If you disable autorun, and you still can't rip a CD, or your ripped MP3s sound garbled or unclear, then you might have stumbled onto one of the newer protection schemes that won't work on a PC. If that's the case, you have three options. The easiest way to make a copy of the disc is to capture the analog output and encode that to MP3 yourself. The resultant sound quality should be pretty good, but you'll probably have to manually input the artist, album, and track info yourself. You can use an app like *Replay Music* (see next page) to accomplish this.

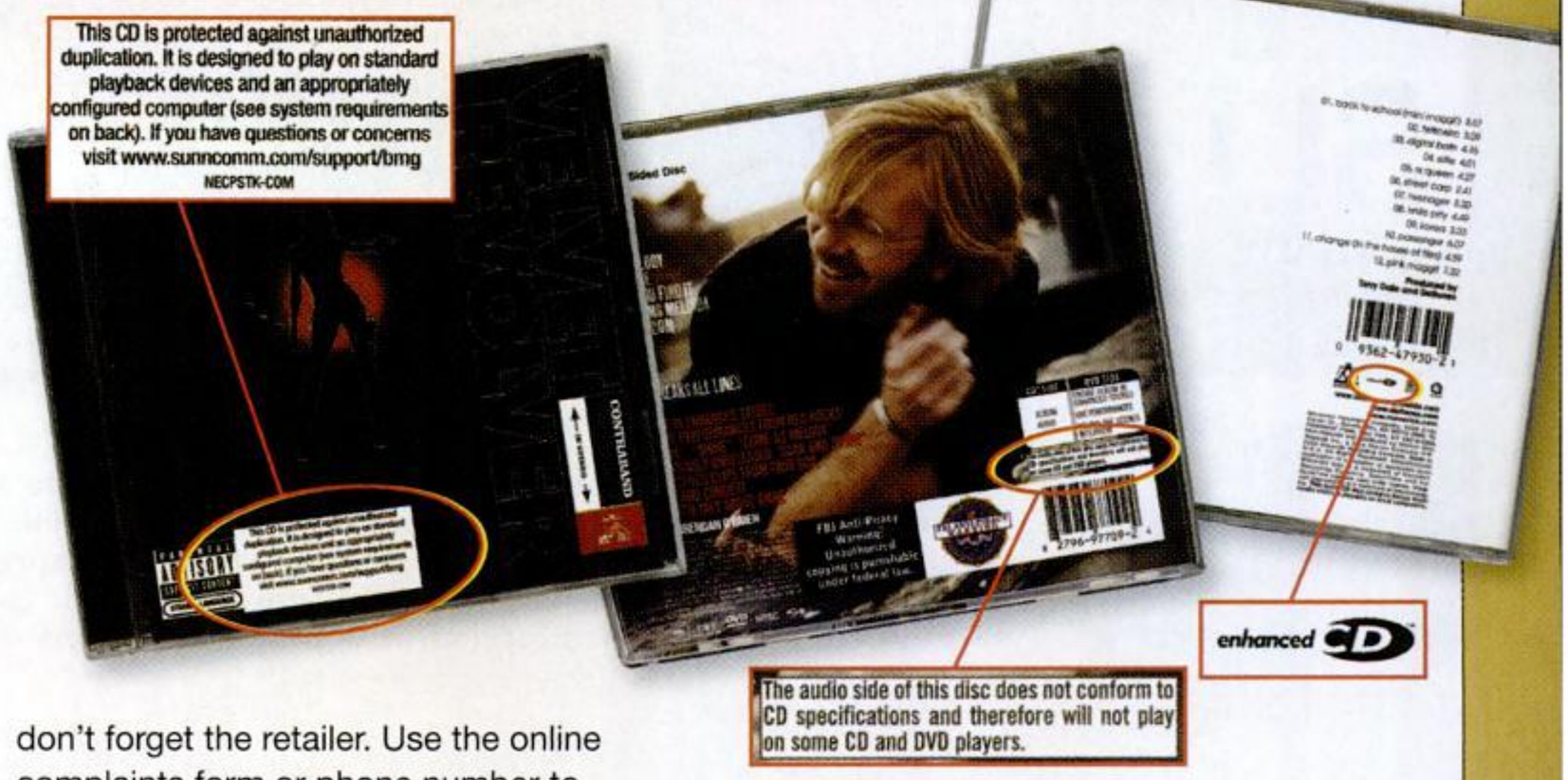
The other thing you can do is hit the Internet. Odds are that someone else has tried to copy this disc before you, and you should be able to find a solution. You may still end up having to rip the CD using the analog trick, but there may be an easy workaround. (One of our favorites required you to mark up the inside edge of the disc with a Sharpie.)

The third option is to try ripping it when AnyDVD is running. AnyDVD includes a feature that automatically corrects table of contents errors (one of the more common protection techniques) and prevents access to any data sessions on the disc, which should prevent the disc from loading any kind of nasty software.

WHO ARE THEY 'PROTECTING' THE MUSIC FROM, ANYWAY?

The easiest way to tell if you're buying a bona fide CD that you'll be able to rip at will is to check the label closely before you buy. If a CD's protection scheme means that its contents no longer follow the Red Book audio CD standard, the CD won't have the standard CD Audio label on it. It may be labeled with something similar, though.

Don't buy CDs that include copy-protection schemes. If you buy one that's protected, but unlabeled, return it, and tell the store you're returning it because you can't make it work with your MP3 player. If you'd like to buy an artist's album, but their discs are encumbered with copy-protection software, send the artist an email, or post to their online message board. Remember to be civil! Explain that you'd like to purchase their music, but you want to use it on your MP3 player, which their label doesn't allow. Finally, don't forget the retailer. Use the online complaints form or phone number to request copyable versions of a protected discs. The record labels might not listen to individual consumers, but they'll sure as hell listen to Best Buy.



When you're shopping for CDs, check closely for the Enhanced, DualDisc, or Protected labels. These discs include technology to prevent you from ripping.

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WHAT YOU'LL NEED

Replay Music ($30, www.replay-music.com)

How to Play Internet Music Anywhere

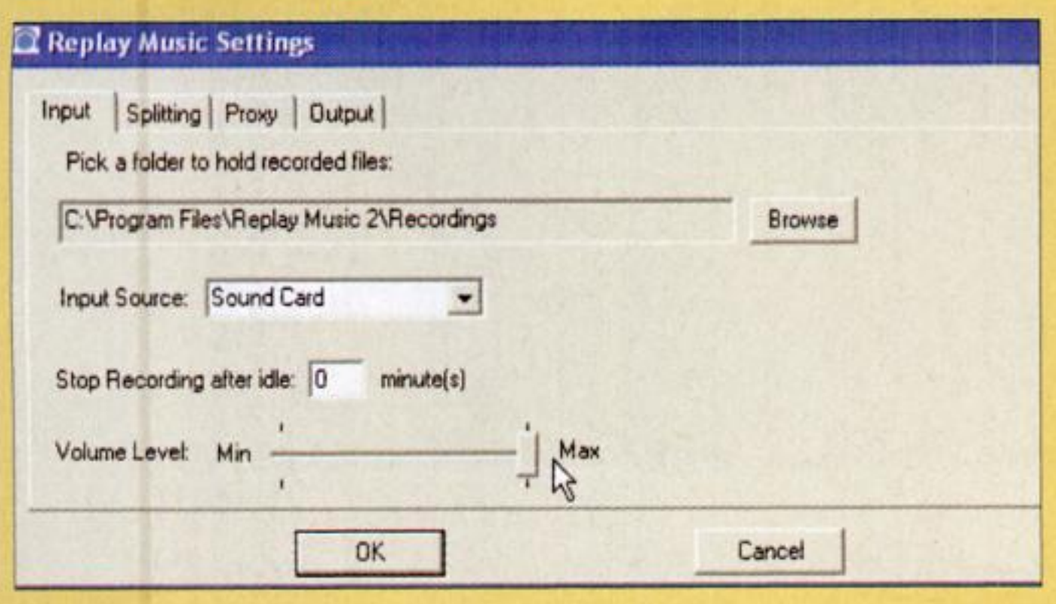
Nothing inspires unbridled rage like purchasing music from an online service, and then discovering you can't play the files on your MP3 player. Luckily, there's a simple detour around this PITA. We're going to show you how to rip the audio stream over the net and capture it to your hard drive, where you can do whatever you want with it.

STEP1 DOWNLOAD AND INSTALL REPLAY MUSIC

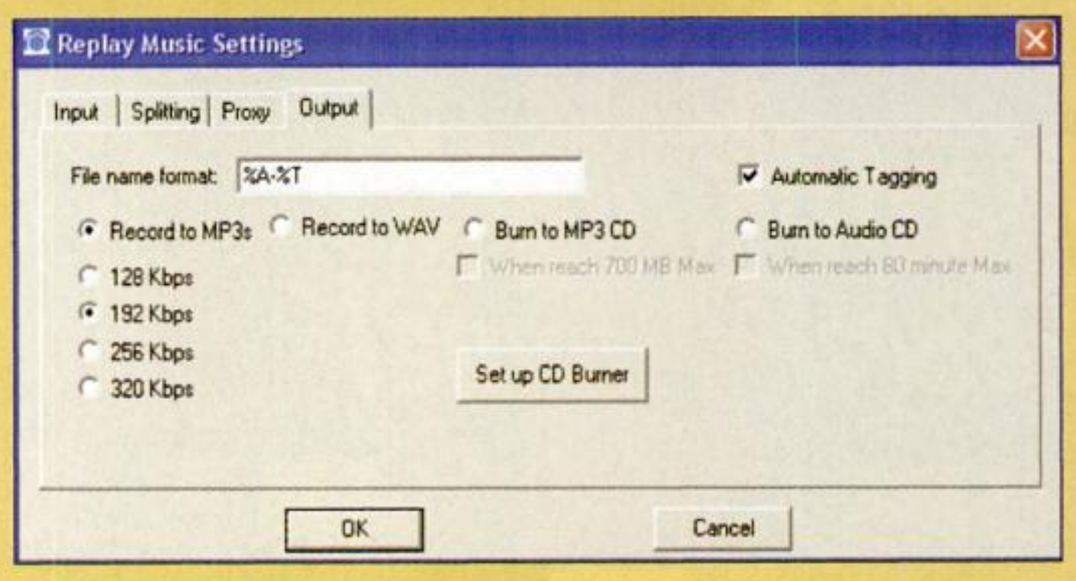
A lot of programs are capable of capturing audio streams and encoding them as MP3s, but Applian Technologies' *Replay Music* is the slickest of them all. It captures audio streaming from the Internet or from your hard drive, splits the stream into individual tracks, and automatically tags them with title, artist, album, and genre information. Once the songs are encoded as MP3s, you can play them on *any* PC or media player.

STEP2 USE YOUR SOUNDCARD AS A SOURCE

You'll need to launch *Replay Music* before you start your streaming service, and you'll need to configure it the first time you run it. Click the Settings button in the lower right-hand corner, and then click the Input tab. Choose Sound Card, and set the volume to max.



STEP3 FINISH CONFIGURING REPLAY MUSIC



Next, click the Splitting tab and make sure there's a checkmark next to Split Tracks. Last, click the Output tab and place a checkmark next to Automatic Tagging. Choose the option to record to MP3, and set the bit rate to your preference. We chose 192Kbps in this example because the subscription service we use streams WMA files at 160Kbps.

STEP4 RECORD YOUR MUSIC STREAM

Leave *Replay Music* running and start playing your protected music. Queue up the tracks you'd like to record and then click Start Recording in *Replay Music*. When the Start Recording Session window pops up, enter `\%A\%a` in the field labeled Directory Format. This will place the recorded tracks in a folder labeled with the artist's name, and in a subfolder labeled with the name of the album.

Click OK and begin streaming music from your subscription service. Note: Don't use your PC for anything else during this process, including instant-messaging. The simple act of resizing a window can create an audible glitch in your recording. When your recording session is finished, you can double-click any track to edit the information describing it. Wasn't that easy? MPC

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Maximum PC's Fourth Annual

Softy Awards

BY THE MAXIMUM PC STAFF

Every year, the editors of *Maximum PC* take stock of the apps, utilities, and other software widgets they use on a daily basis, to determine which are the best—the programs we have to share with the world! This year, we selected eight pieces of software—many of them open-source, and almost all of them free—that have changed the way we use our computers. Without further ado, here are the 2006 Softy winners!

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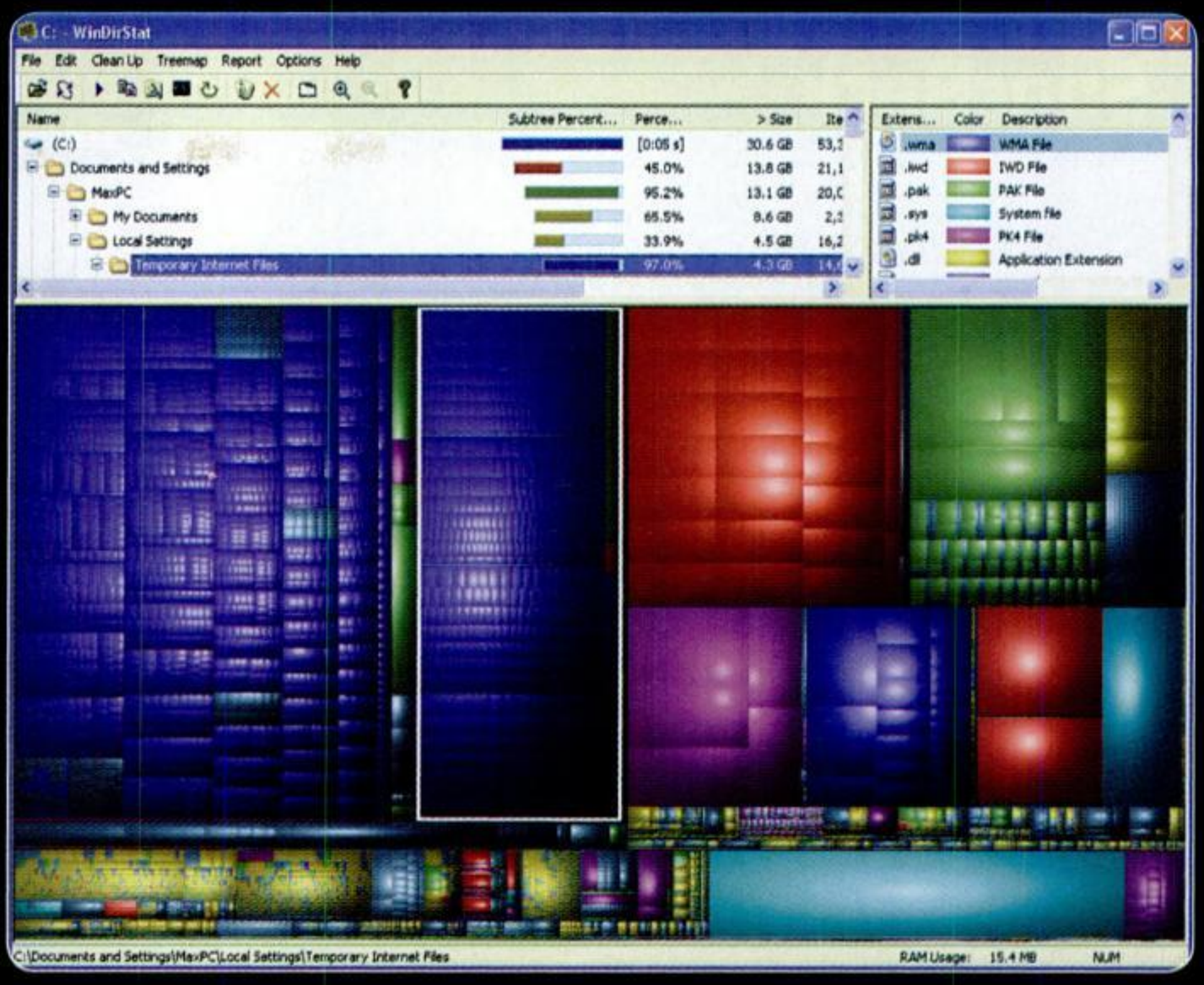
WinDirStat

Install this utility and you'll never need Windows Explorer again

Ever wonder what exactly consumes all that space on your hard drives? Don't bother launching Windows Explorer—you'll only find frustration as you repeatedly expand and collapse one directory after the next. Install *WinDirStat* instead. This awesome utility will read your entire directory tree and present its findings in three supremely useful views: a directory list, an extension list, and the most revealing of all—a treemap.

In the treemap view, each directory is represented by a cluster of colored rectangles proportionate to the space on the disk those directories consume. Smaller rectangles within the larger ones represent individual files. Large files and directories jump out at you instantly.

FREE HTTP://WINDIRSTAT.SOURCEFORGE.NET

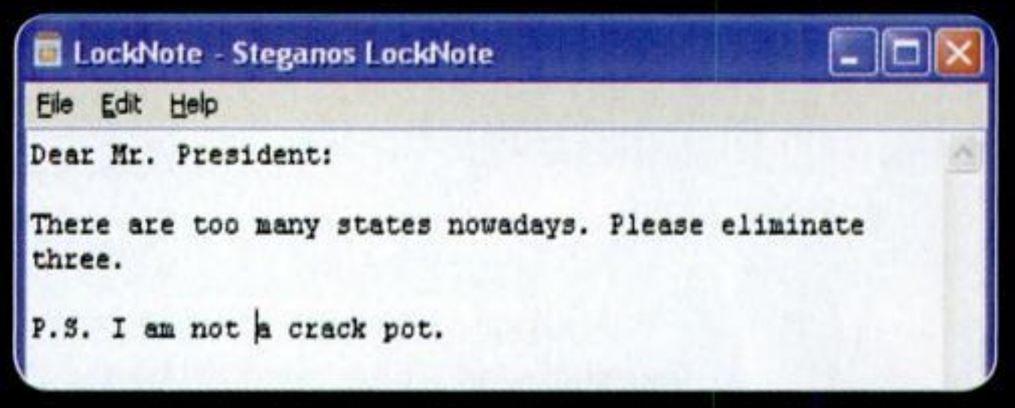


It took *WinDirStat* all of 30 seconds to reveal that temporary Internet files—nearly all of them WMA files—are wasting 4.3GB of space on this hard drive.

Steganos LockNote

Free, secure, and damned-easy to use

Encryption is only effective when it actually gets used. And to get used, you have to make it easy. Folks, it doesn't get any easier than Steganos' *LockNote*. *LockNote,* a kind of encrypted *Notepad*-analog, let's you easily create text notes that are protected with 256-bit AES encryption. With a strong password, you'd need a stadium full of Opterons and years to crack the security. The app itself doesn't even need to be installed, simply clicking on the .exe opens a *Notepad*-like interface. You can also drag your existing *Notepad* files onto the app and *LockNote* will create a new encrypted file from it. We're already storing our enemies list in a *LockNote* file at work, knowing that our HR department can't get at it.

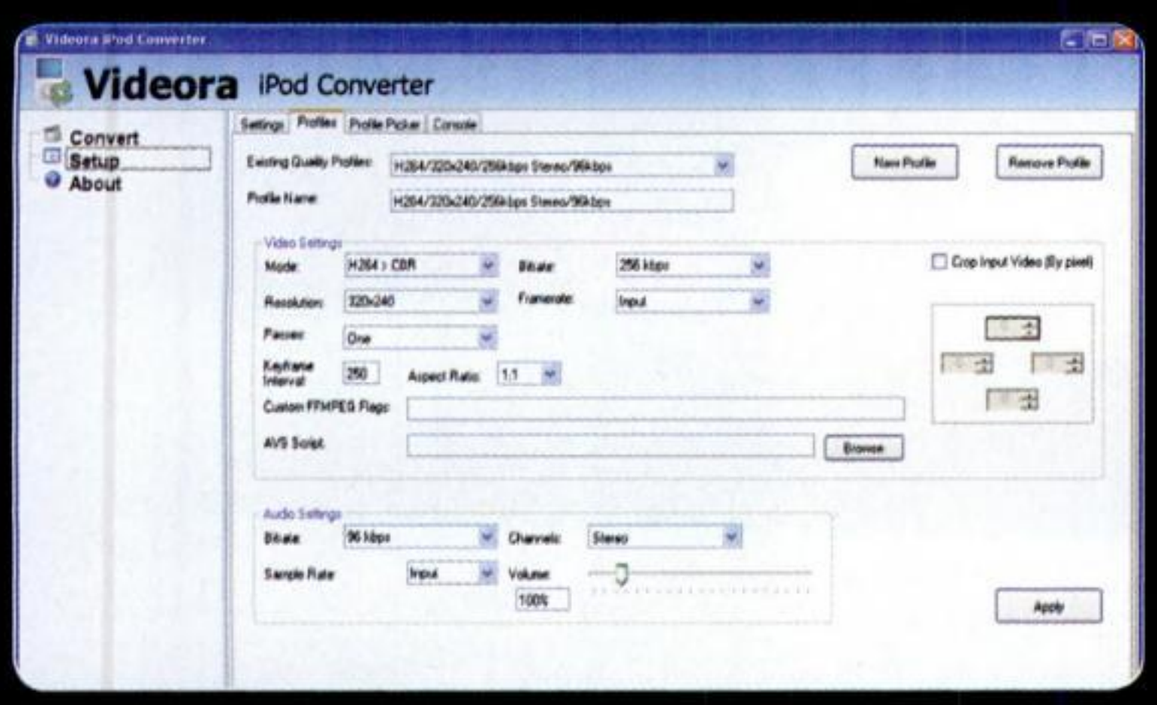


Keep your secret notes a secret with Steganos' free *LockNote*!

FREE WWW.STEGANOS.COM

Videora Conversion Tools

These video-transcoding tools are both brilliant and effortless



We've encountered numerous tools for video transcoding, but none that are more complete or easier to use than the one-two punch of *Videora* and *Videora Converter.* The developers call their concept ITVCasting: Use *Videora 2.0* and its built-in BitTorrent client to find and download video from the Internet, and then load these files—or any other video clips stored on your hard drive—into *Videora Converter.* The program will then transcode them to the appropriate format and automatically transfer them to an attached player. Converters are available for the Xbox 360, Tivo, PSP, and Video iPod. It works with RSS feeds, too.

FREE WWW.VIDEORA.COM

Although its default profiles work great, *Videora Converter* gives you absolute control over every aspect of the video-transcoding process.

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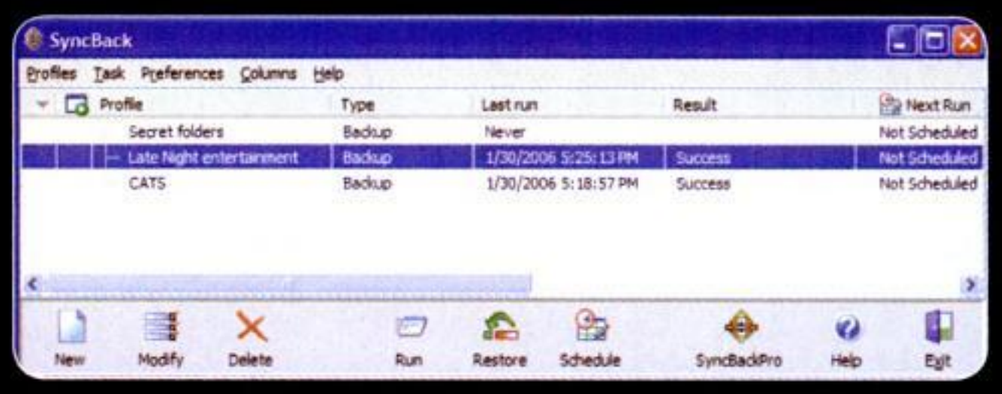
SyncBack

There's never been a better time to back up your data

Data backup: It's a task as exciting as clipping your nose hair or getting a colonoscopy. But both tasks are a necessary part of nose and colon maintenance, just as backing up data is necessary to maintaining your PC. Our favorite utility for this task is *SyncBack*, an incredibly powerful—and totally free—backup utility that's as easy to use as it is powerful.

SyncBack lets you create numerous backup scripts and schedule them to your heart's content. You can quickly sync files and folders, and even restore accidentally deleted folders if you make a boo-boo.



Creating and scheduling backups in *SyncBack* is easy like a Sunday morning.

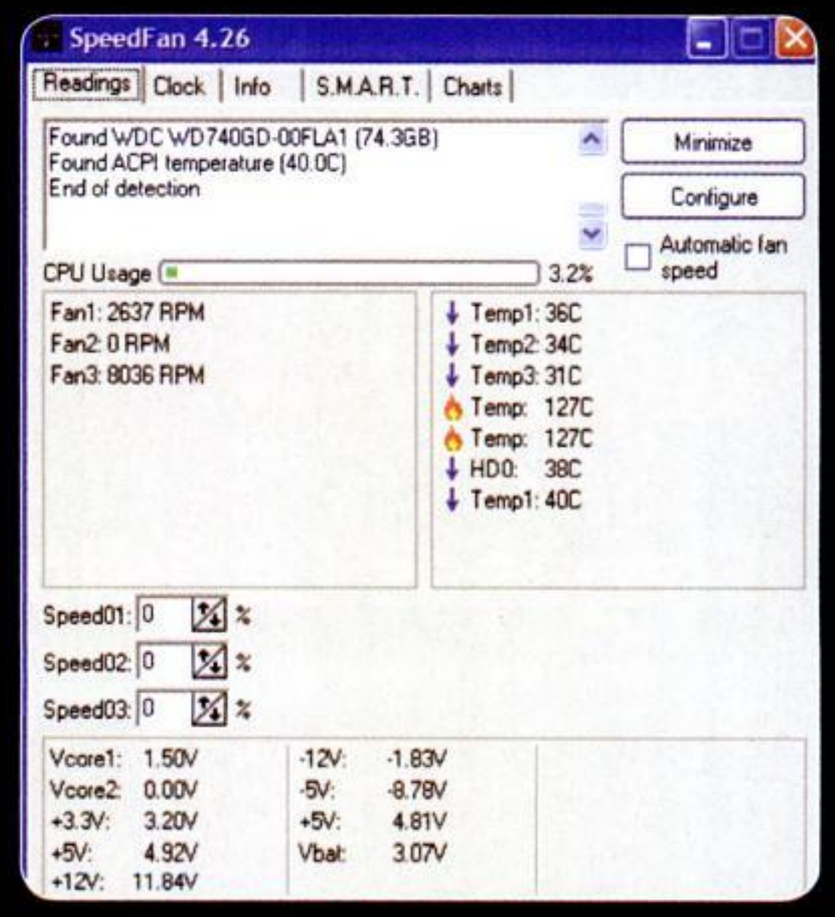
FREE WWW.2BRIGHTSPARKS.COM

SpeedFan

Track temps and futz with fans the right way

It's probably not healthy, but we're obsessed with controlling our system's temps and sound output. That's why we like—nay, love—*SpeedFan*. It's an awesome utility that reports system temps (including hard drive temperatures), and lets us control fan speeds based on the temperature thresholds we determine.

The temp reporting is useful, but the real value is the fan control. You can use it to set the maximum and minimum fan speeds based on the temps your mobo reports, so your fans spin up when things get hot and spin back down when they're no longer needed.

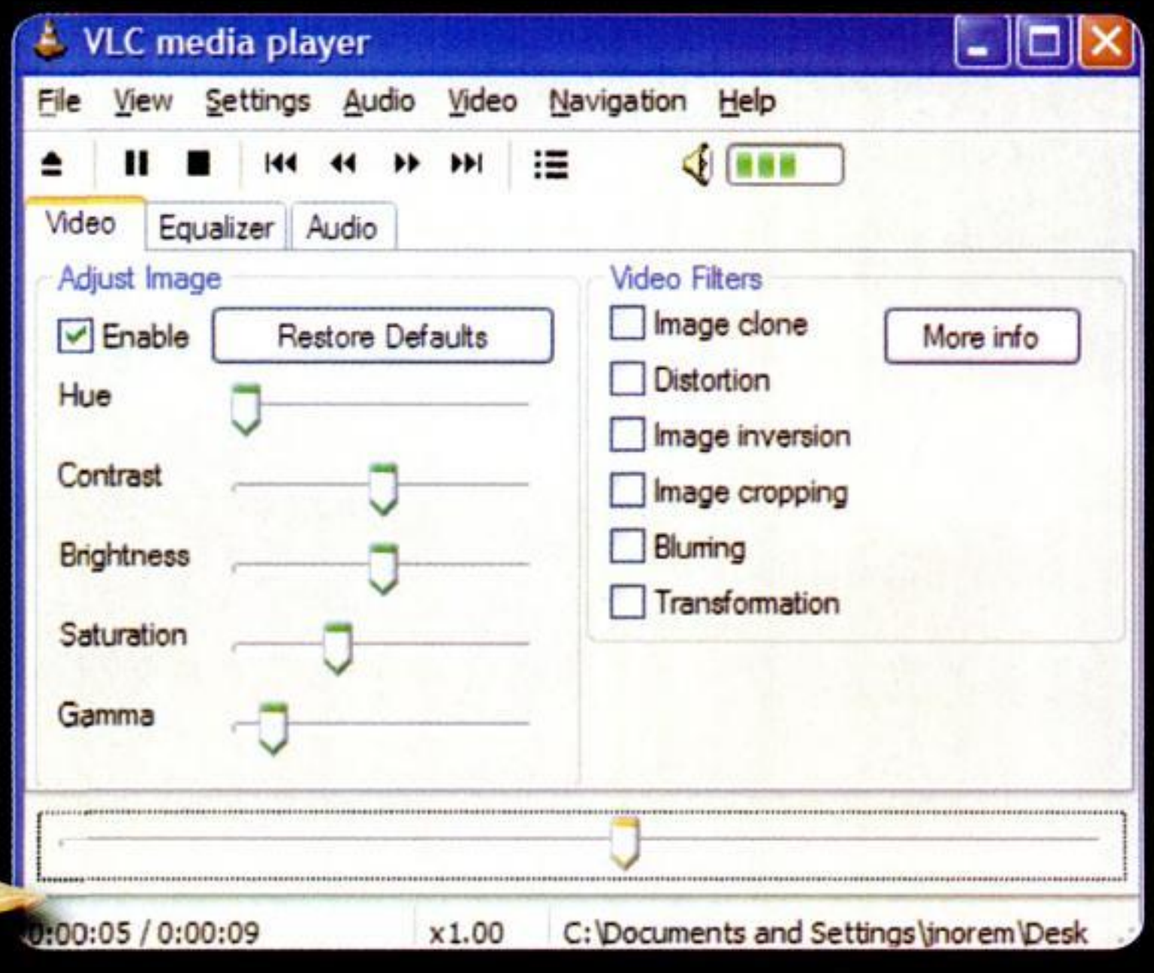


Whether you're looking to monitor your system temps or quiet your rig, *SpeedFan* delivers on both fronts.

FREE WWW.ALMICO.COM/SPEEDFAN.PHP

VLC Media Player

The only media player you'll ever need



VLC Media Player is the one media player to rule all formats. It plays *everything*, including VOB files, MOV files, FLAC, Divx, AVI, MPEG, WAV, MP3, SVCD—you name it. It won't play Real player files, but we usually avoid those on general principle.

And *VLC* isn't just for Windows. It runs on every possible platform, including BeOS, BSD, Linux, and OS X. It can be a bit sluggish, but its flexibility is unmatched, and it's free, so you won't catch us griping.

FREE WWW.VIDEOLAN.ORG/VLC

In addition to playing every type of media file imaginable, *VLC* can also act as a streaming server.

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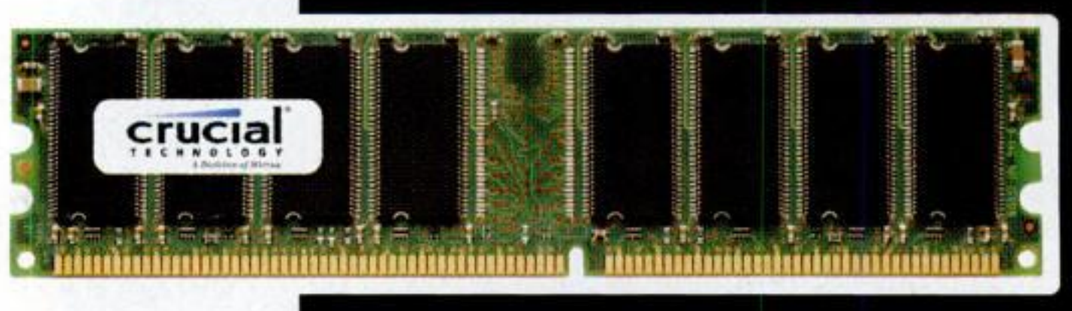
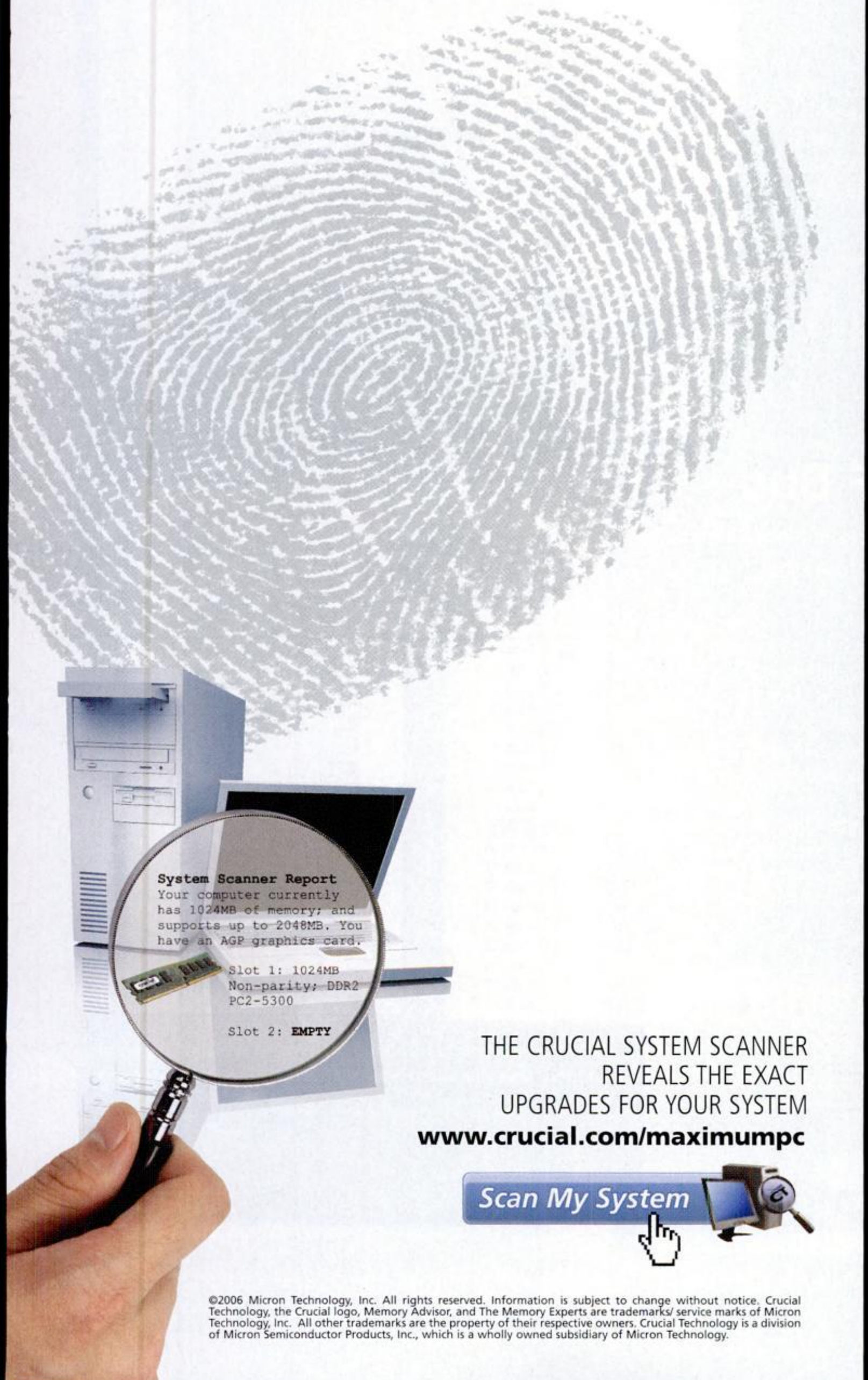


MEMORY MYSTERY SOLVED, CASE CLOSED.



THE CRUCIAL SYSTEM SCANNER REVEALS THE EXACT UPGRADES FOR YOUR SYSTEM

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Finding a memory upgrade for your computer doesn't have to involve a lot of detective work. With just one click, the Crucial System Scanner takes the mystery out of finding the right RAM.

You know that you're ready for better performance by upgrading your system memory, but you're not sure WHICH memory is right for your computer. You might not even know your computer's manufacturer and model, much less anything about the mind-boggling mix of memory shapes, sizes, speeds, and capacities.

So how are you supposed to know which upgrade to buy? Don't spend hours tracking down the right memory — let the Crucial System Scanner take the guesswork out of upgrading! In just one click, our System Scanner tool analyzes your PC's configuration, then automatically recommends the exact upgrades for your system.

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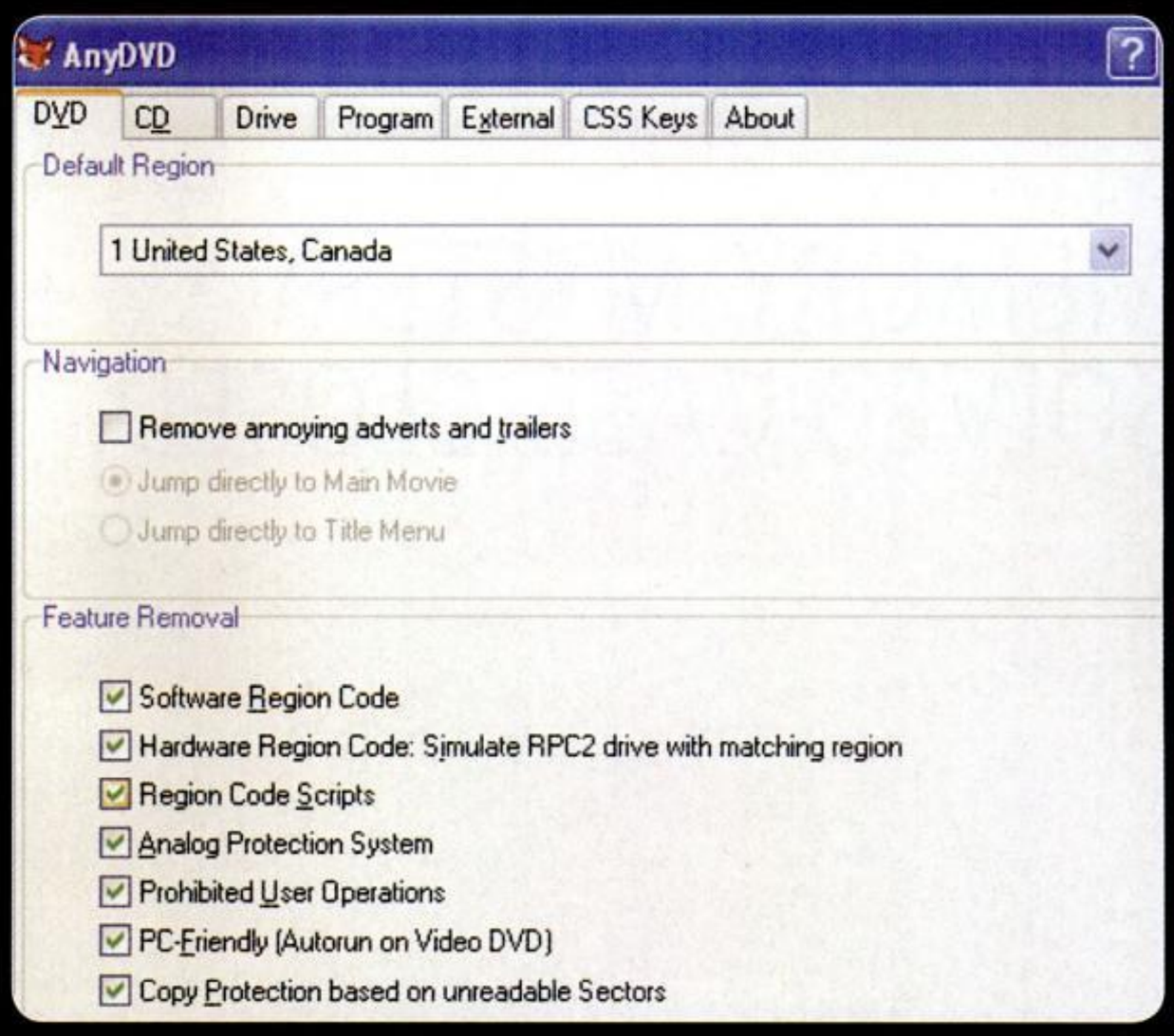
AnyDVD

Free your DVDs! Free your CDs! Stick it to The Man!

Whether you want to watch movies on your PSP; make a quick copy of *Finding Nemo* so your kids don't scratch up the original; or just rip a CD that's encumbered with "copy-protection," so you can play it on your MP3 player, *AnyDVD* will make it happen. While *AnyDVD* doesn't include any specific ripping or conversion functionality, it does automatically decrypt the contents of any disc you put in your optical drive, on the fly. Be it a DVD or CD, making a copy of your disc is as simple as dragging and dropping its contents to your hard drive.

If that's not enough, *AnyDVD* even deactivates the forced previews and other annoying adverts that run before many DVDs these days.



***AnyDVD* doesn't sport much of an interface, just a few screens with options. But don't be fooled—*AnyDVD* has the power to unlock all your media!**

$40 WWW.SLYSOFT.COM

The Deadly PDF Duo

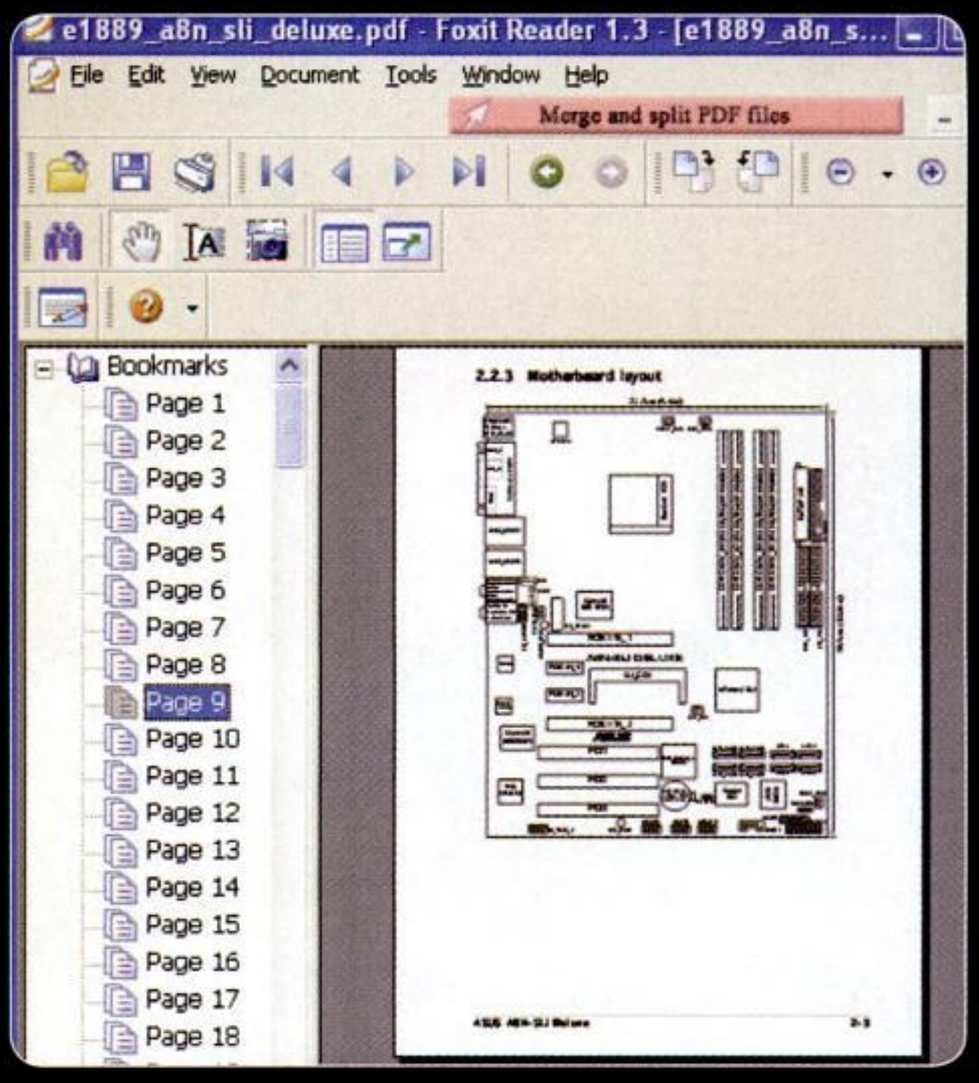
PDF files are a fact of life, but the PC-based tools are a drag. Here are two kick-ass free alternatives to Acrobat

One thing that most PC users will agree on is that *Acrobat* sucks Acro-ass. It takes an insane amount of time to load and the full version is stupid-expensive. Lucky for you, there are a couple of excellent, free, alternatives—*Foxit PDF Reader* and *PDF Creator.*

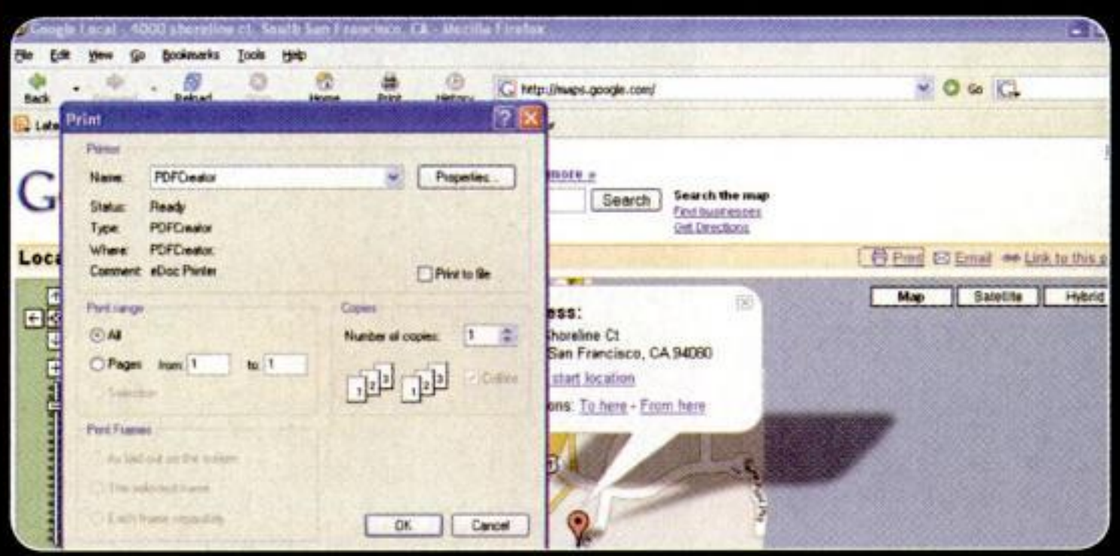
Foxit PDF Reader loads fast, and lets you read, print, and even input data into some PDFs. In fact, we managed to download and install *Foxit* in the time it took *Acrobat Reader* to open on a particularly slow PC.

PDF Creator is a brilliant open-source project that adds a special printer driver to your Windows install. When you want to make a PDF, simply print to that driver, and your PDF will be created in a jiffy.

Install these two apps, and you'll never have to face *Acrobat* again! MPC



Don't waste another second waiting on *Acrobat Reader* to load. Use the super-speedy *Foxit PDF Reader* instead!



Using *PDF Creator*, you can create PDFs from any application that has a Print function.

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BUILD YOUR OWN

The only way to get the exact notebook you're looking for—with a CPU, hard drive, and chassis that perfectly suit your needs—is to build your own! Let's get started

You can build a desktop PC while chained in an underwater cage filled with testy sea bass. You can build, boot, and overclock a small formfactor rig blindfolded. You think you're the Jedi Master of do-it-yourself PC building. Think again, Padawan. Are you ready for the next step? Are you ready to build your own notebook?

Whether you call it a DIY notebook, whitebook, or barebook, configuring and building your own laptop computer is the final test before you ascend to PC greatness. Of course, it goes without saying that building your own notebook is significantly more challenging than building a mere desktop or SFF.

With their cramped interiors and butterfly-delicate components, notebooks aren't a wise undertaking for the ham-fisted tyro who has problems snapping a memory module in place without bending things. That doesn't mean you should be afraid. If you have the motor coordination and patience to build a model X-Wing, you can easily build your own notebook.

So when you're sitting in a café cruising the net and someone asks you who built your notebook, you can respond with pride: "I did!"

BY GORDON MAH UNG

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LAPTOP

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BUILD YOUR OWN: WHAT YOU NEED TO KNOW

We know you have some questions, we had a ton before we got started. We'll tell you why you'd even want to build your own laptop, and let you in on the pros and cons

Q: Does anybody really build their own notebook?

A: We'll admit that building a notebook isn't what the normal, or even advanced, PC user typically does. Look into the computer room of the most hardcore PC master and he or she will probably have a Sony, Dell, or HP notebook mixed in with a handful of home-built towers. But while building your own notebook is still a fringe hobby, it's definitely picking up steam. More and more vendors are selling notebook kits directly to end users.

Q: How is building a notebook different than building a desktop PC?

A: When you build a desktop PC, you can select the case, pick a motherboard and CPU, and so on. Building a notebook is more akin to building a small formfactor system, where you choose a case and motherboard combo, and then take whatever other hardware will work it. With a notebook, you first need to select the chassis you want, which informs the type of CPU you'll use, the type of 3D card you can install, and even the size screen you get. Once you've selected the chassis, all you have left to do is purchase memory, a hard drive, and other accessories.

Q: If I can't change the screen, graphics, or CPU family, do I really have control over any of the configuration?

A: Well, yes. Many of the big companies let you make minor adjustments to the configuration of their notebooks when you place an order, but they usually limit certain components to more expensive models. You can't, for example, order a $500 budget 1.4GHz Celeron M notebook and have the company upgrade the CPU to a 2.2GHz Pentium M. In order to do that, you have to step up one or more classes of notebook, which naturally cost more money. In a DIY notebook you can run whatever processor fits your budget and requirements—from an $80 1.3GHz Celeron M650 to a $600 2.26GHz Pentium M 770. The same goes for the hard drive, optical drive, and everything else.

Q: What tools will I need?

A: To build the exact same notebook we built, you'll need a quality set of precision screwdrivers. We recommend that you invest in Wiha's basic eight-piece set of precision screwdrivers (www.wihatools.com) that includes both slotted and Phillips tools. Don't even think of using the cheap $3.99 "jewelers" screwdriver set you picked up at the flea market. These cheap tools usually result in bunged-up or stripped screws. We also needed a paper clip to transplant our optical drive, and a magnet to pick up the screws we dropped. You should keep a container handy for storing the screws, as well.

Q: What are the potential pitfalls?

A: The biggest hurdle to overcome is accidental destruction of the even-more-delicate-than-normal mobile hardware. It's much easier to bend, break, or destroy the notebook during construction than it is with standard desktop parts. And beyond that, as with any DIY project, the only person responsible for troubleshooting and fixing problems will be you. (While our AOpen kit comes with a one-year warranty, there's no option for an extended warranty and no on-site tech support.)

Q: What does a DIY notebook cost and where can you buy one?

A: We used an AOpen 1559 unit for our step-by-step walk-through. It came with a combo DVD-ROM/CD-RW drive and cost about $590. We added a 2.13GHz Pentium M 770 ($450), 1GB of DDR2 RAM from Corsair ($140), a 100GB SATA Seagate Momentus 7,200rpm drive ($160), a Mini PCI Wi-Fi A/G/B card ($32), and an 8x DVD burner that supports dual-layer burns ($80). The last two components were difficult to find, but we got ours from Newegg.com. The 1559 can't be purchased directly from AOpen, but is available from both Chemusa.com and Jetta.com as a barebook.

Continued on page 44→

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Outgrown your data storage?

Move up to a 2-GB DataTraveler Flash drive.

Your library of photos, music, videoclips and data is constantly growing. If you're storing it on multiple Flash drives or even CDs and DVDs, you need to move up to a 2-GB* Kingston® DataTraveler®. It offers high capacity without the high price, and it's one of a wide range of Flash memory solutions from Kingston, the world's independent memory leader. Plus it comes with a five-year warranty and free, 24/7 tech support, so you'll sleep better at night.

5YEAR WARRANTY

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HI-SPEED CERTIFIED USB

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BEFORE YOU BUY

You've decided you're ready to build your own laptop, but it's a little different than building a desktop. Before you purchase the first part, you must read our buyers guide

Desk Potato or Road Warrior?

Before you search for a DIY platform, you should first figure out what you really want to do with the notebook. Do you want a widescreen, 10-pound desktop-replacement beast with the power of a desktop and piss-poor battery life, or would you prefer a lightweight, long-running notebook PC that has the gaming prowess of a turnip? These might sound like extremes, but that's the decision you face with most bare-bones notebook kits.

The CPU

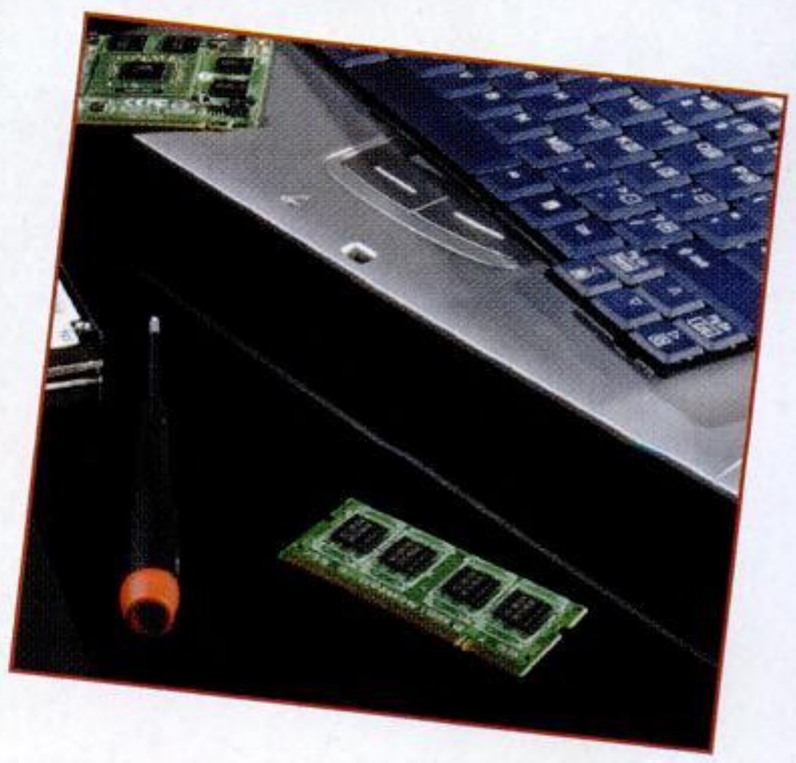
Generally, desktop replacement notebooks lean toward Pentium 4 and Athlon 64 CPUs, which can be cooled and powered by the larger chassis designs. That's not always the case, though, as we're seeing more and more large desktop-replacement notebooks with Pentium M chips. Which should you buy? We recommend the Athlon 64 for desktop replacements; it's fast, and its thermals aren't out of control. If you're looking for more portability, the Pentium M is a great CPU that offers plenty of power at high clocks and pretty good power savings when purchased in lower-power-consumption trims. What about the P4? While it's not too horrible at, say, 3GHz, at 3.8GHz and 3.6GHz, it's just too hot to handle. We'd take the Athlon 64, a Turion 64, or a Pentium M over a hot-running, high-clocked Pentium 4.

Far Cry or Yahoo Chess?

As with the CPU, you need to weigh your needs for graphics. Graphics chips soldered on the mobo, such as Intel's alleged "Extreme" integrated GPU, are as genuinely extreme as a Mountain Dew ad. If you want the best battery life, however, integrated is the way to go. At the other end of the spectrum are discrete mobile solutions, such as nVidia's GeForce Go 7800 GTX. It offers gaming performance that's faster than many desktop machines. It's fast, but it's also power hungry and hard to cool. Because it's so hard to cool, you'll only find this part in large notebooks. In the middle, you have nVidia's GeForce Go 6600, which offers pretty good gaming performance and middle-of-the-road battery consumption. A good rule of thumb: The faster your 3D card, the more juice it's going to suck.

Upgradeable Graphics

There are currently two standards for PCI Express graphics modules: nVidia's MXM and ATI's AXIOM. Neither is compatible with the other, and it's almost impossible to tell who's winning the standards battle. The upshot is that upgrading your nVidia-based notebook with ATI graphics, or vice-versa, probably won't happen. (And even if you could get your hands on a faster card for your notebook, is the chassis capable of keeping it cool?) You should assume that any graphics upgrade path will be limited to the vendor you begin with.



Hard Storage

Depending on what notebook you buy, you'll either have the old-school (but still quite capable) parallel interface or the more modern SATA connector. Don't get hung up on this as the interface doesn't really matter. It's the actual speed of the drive that matters most. Your choices range from 4,200rpm (slow) to 5,400rpm (medium) to 7,200rpm (fast). And just like every other component, the faster the spindle speed, the more power it consumes. Once you choose the interface and speed, select a drive with enough capacity for your needs. There's one more catch, though: Some notebook chassis will only accommodate drives of a certain height—so make sure the drive you buy is thin enough to fit into your rig.

Don't Leave Home Without It

A move was made last year to finally replace the ancient PC Card interface with the much faster ExpressCard. ExpressCard hooks into PCI Express and USB and offers about 500MB/s maximum theoretical throughput, versus a CardBus PC Card's 33MB/s. We like more speed, but unfortunately haven't seen many peripherals that need that kind of bandwidth. Even worse, a majority of ExpressCard notebooks do away with PC Card slots altogether, so you won't be able to use your legacy hardware. However, if you have special needs, such as FireWire 800 or Gigabit, ExpressCard is the way to go.

Continued on page 46→

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Winner, Best RPG of E3

– *Game Critics Award, GameSpot, IGN, GameSpy, Xbox Evolved, Console Gold, Daily Game, Games Domain*

"One look at Oblivion will shatter your conceptions about what is possible in a video game."

– *GameInformer*

"The biggest title for the Xbox 360™, and the one I'm most looking forward to."

– *GamePro Magazine*

"Oblivion is, at this time, the best-looking game I have ever seen in my life."

– *Xbox.com*

"To call the graphics 'amazing' is an extraordinary understatement."

– *GameSpy*

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The RPG for the Next Generation

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STEP-BY-STEP: ASSEMBLING YOUR RIG

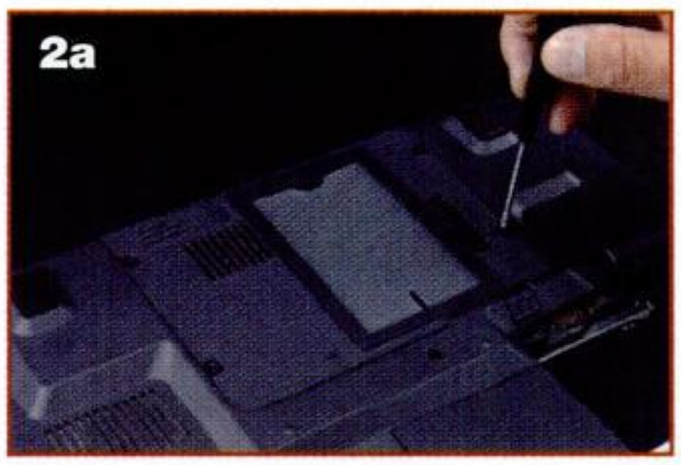
Follow our guide—carefully—and you'll have your new laptop up and running in no time. Before you do anything, make sure you read (and understand) every step

Step 1: Prep for Takeoff

Remove the battery before you begin, to avoid damaging your components. Our notebook came with a plastic sheet covering the LCD, to prevent damage during shipping. We recommend that you leave this protective shield in place while you build the notebook.

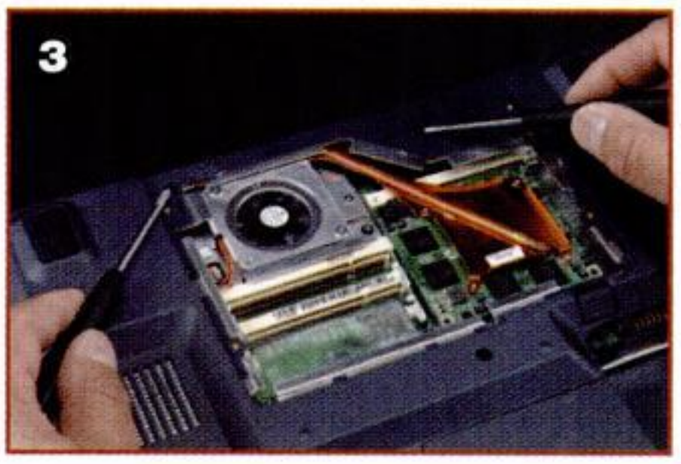
Step 2: Access RAM and GPU

Flip the notebook so you can access its bottom and unscrew the four screws that hold the large access plate shut (image a). Slide the plate to remove it (image b).



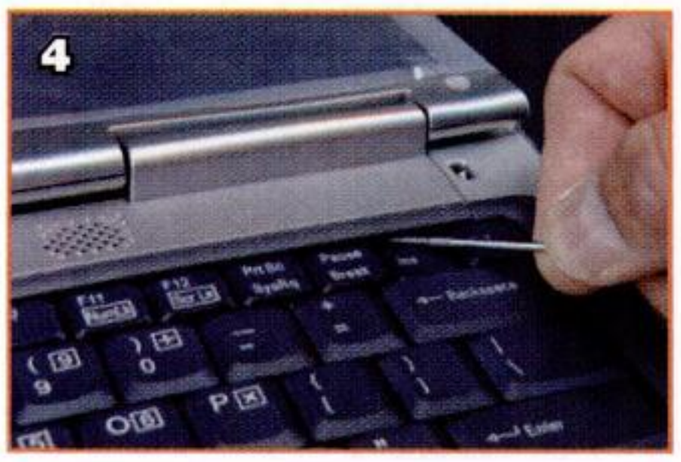
Step 3: Turn Your Screw

Remove two of the screws located at the rear of the notebook underside, below the access plate. These attach to a panel on the notebook's face that contains the speakers, the power button, and the CD control buttons, and which also prevents the keyboard from moving (see image 5). AOpen calls this the "middle panel."



Step 4: Pry It Off

Flip the notebook upright and open the screen so that it's flush with the tabletop. Using a slotted or flat-head screwdriver, begin carefully prying the middle panel from the notebook starting from the right-hand side. This is one of the only steps where you can easily break something if you're too rough. Also keep in mind that the panel is wired to the motherboard so don't lift the panel more than an inch while removing it. Once you have the right side of the panel up, you can slowly work your way to the left hand side.

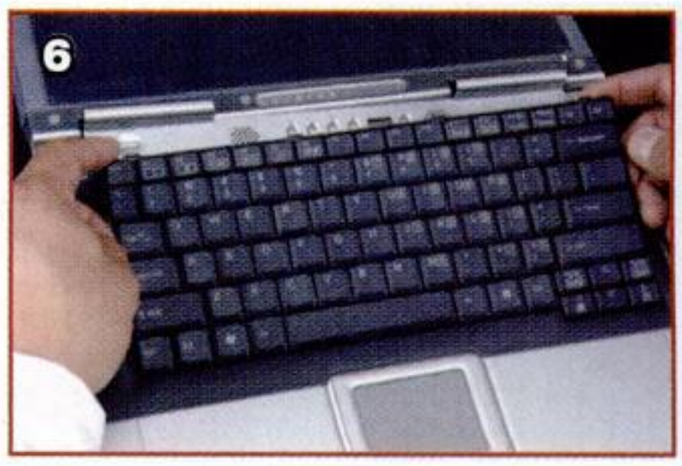


Step 5: Lift and Tuck

You can unplug the CD player controls, the LCD display, and power, if you must, but for our purposes, you can just lift the entire panel and tuck it out of the way.

Step 6: Don't Tear the Ribbon

You can now lift out the keyboard. Start from the top of the keyboard and slowly tilt the keyboard out. You'll need to apply gentle pressure to get the keyboard clear of the set of plastic tabs along the side of the case. The keyboard is also attached to the rig by a ribbon cable at the bottom, so be gentle. Once it is clear of the chassis, you can flip the keyboard forward to give you full access to the CPU and Mini PCI card. You do not have to remove the ribbon cable from the keyboard.



Step 7: Call Me Centrino

You won't find Mini PCI Wi-Fi cards at most PC stores, so we turned to Newegg.com, where we found an Intel 2915ABG card for a mere $32. Mini PCI cards install like SO-DIMM memory cards, so you'll need to align

the card with the slot (image a). Then attach the two antenna leads. The black lead should snap into the antenna connector on the left, while the gray lead goes on the right (image b). Lock the card into place by putting it into the Mini PCI slot at an angle. You

Continued on page 48→

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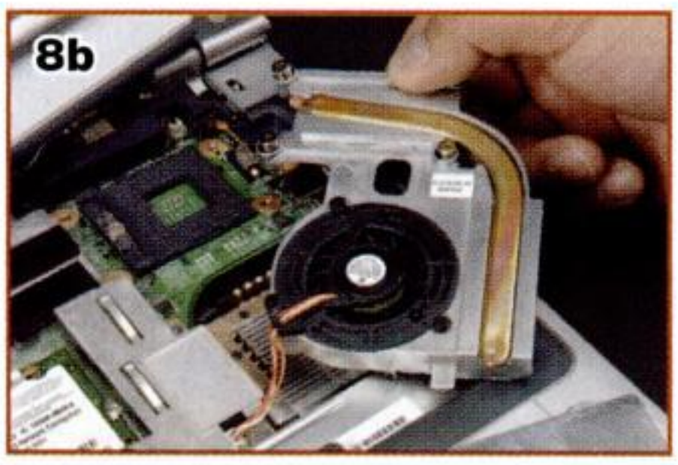
Continued from page 46

should be able to push the card in about an eighth of an inch. Once it's in place, tilt the card toward the notebook until the retention arms on either side of the card lock it in place. We now technically have a "Centrino."

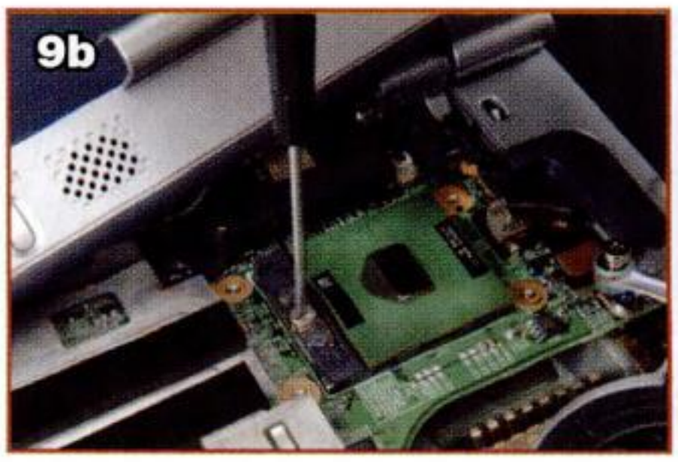
Step 8: Remove the Heat Pipe

A heat pipe and fan will cool your CPU. Unscrew the four screws holding the heat pipe down over the socket (image a). You should now be able to slide the heat pipe out of the way (image b). If you want to completely remove the heat pipe, you have to unplug the cooling fan, but that's not necessary. You can simply move the cooling assembly out of the way, and rest it on top of the keyboard. Make sure you don't smudge or dent the thermal pad on the bottom of the heat pipe, though.



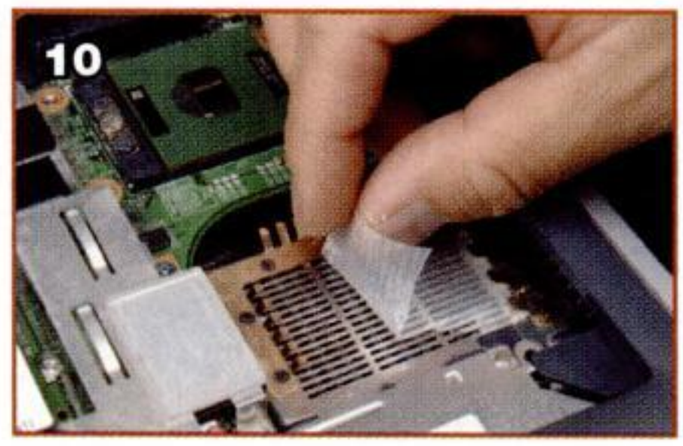
Step 9: Install the CPU

Intel's Pentium M processor can be difficult to find, but online vendors such as Newegg.com carry the proc. The Pentium M 770 we selected (the fastest this notebook's chassis and cooling mechanism are rated for) is clocked at 2.13GHz on a 533MHz front-side bus and has 2MB of L2 cache. Align the CPU's gold arrow with the arrow on the socket (image a). It should drop right into the socket, without requiring any force. If it doesn't, the socket might be in the closed position. Use a slotted screwdriver to unlock the socket and try again. Then use the slotted screwdriver to lock the CPU in place (image b).



Step 10: Open the Port

Our bare-bones notebook came with plastic tape blocking the intake port for the CPU heat pipe. Make sure you remove the tape, or the notebook will overheat.



Step 11: Reinstall the Heat Pipe

When you screw down the heat pipe, make sure the screw heads are flush with the heat pipe, or the heads might bump into the back of the keyboard.

Step 12: Remount the Keyboard

Reinstall the keyboard by hooking it under the lower palm rest. In our picture, it's the little metal tab just under the right cursor key. Gently tilt the keyboard back into place while applying firm but gentle pressure along the sides to push the keyboard past the plastic tabs on the side of the keyboard tray that hold it in place. Make sure the ribbon cable along the bottom of the keyboard is flat and not being pinched. Also make sure the two wires for Wi-Fi are out of the way, so they won't be pinched.

Step 13: The Battle for the Middle Panel

Reinstall the middle panel by snapping it into place from right to left. It should snap right into place. If the keyboard or middle panel shows any bulging, something might not be aligned properly or a wire could be in the way. If that happens, gently remove the middle panel and keyboard and check that everything was properly installed.

Step 14: Install the RAM

The 915-chipset supports dual-channel RAM, which requires you to install a pair of

Continued on page 50

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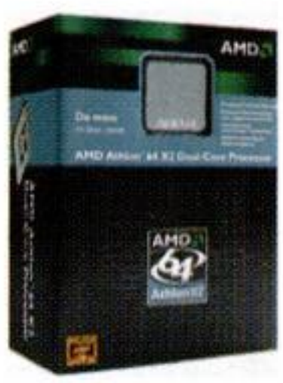
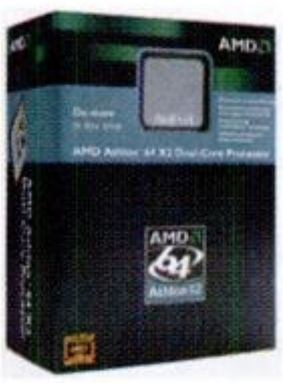
- L2 Cache: 1024KB x2



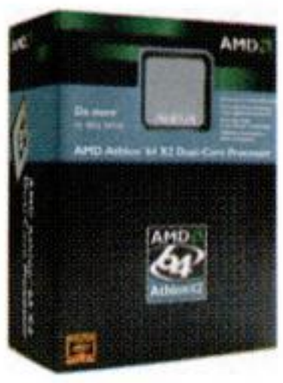
Athlon™64 X2 4800+* Processor

- Part Number: 80728-R
- Code Name: Manchester
- Thermal Power: 128W
- L1 Cache: 128KB
- L2 Cache: 1024KB x2



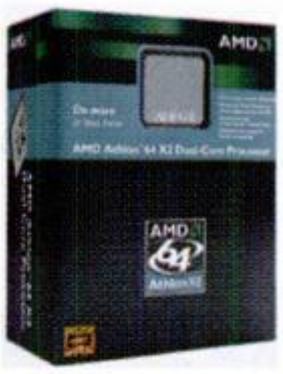
Athlon™64 X2 4600+* Processor

- Part Number: 80727-R
- Code Name: Manchester
- Thermal Power: 110W
- L1 Cache: 128KB
- L2 Cache: 512KB x2



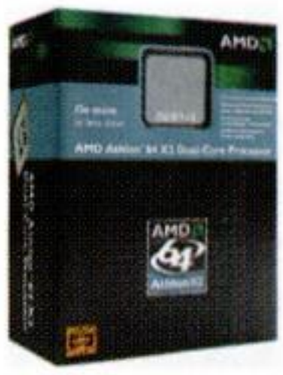
Athlon™64 X2 4400+* Processor

- Part Number: 80726-R
- Code Name: Toldedo
- Thermal Power: 110W
- L1 Cache: 128KB
- L2 Cache: 1024KB x2



Athlon™64 X2 4200+* Processor

- Part Number: 80725-R
- Code Name: Manchester
- Thermal Power: 89W
- L1 Cache: 128KB
- L2 Cache: 512KB x2



Athlon™64 X2 3800+* Processor

- Part Number: 80721-1
- Code Name: Manchester
- Thermal Power: 89W
- L1 Cache: 128KB
- L2 Cache: 512KB x2

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* This model number indicates relative software performance among this AMD processor family. [1] Enhanced Virus Protection (EVP) is only enabled by certain operating systems including the current versions of Microsoft® Windows®, Linux, Solaris and BSD Unix. After properly installing the appropriate operating system release, users must enable the protection of their applications and associated files from buffer overrun attacks. Consult your OS documentation for information on enabling EVP. Contact your application software vendor for information regarding use of the application in conjunction with EVP. AMD and its partners strongly recommend that users continue to use third party anti-virus software as part of their security strategy.

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Continued from page 48

SO-DIMMs. We used a pair of 512MB DDR2 modules. Install the first module in the lower bank by pressing the contact edge of the RAM into the slot about an eighth of an inch, while holding the module at an angle.

Step 15: Snap the RAM into Place

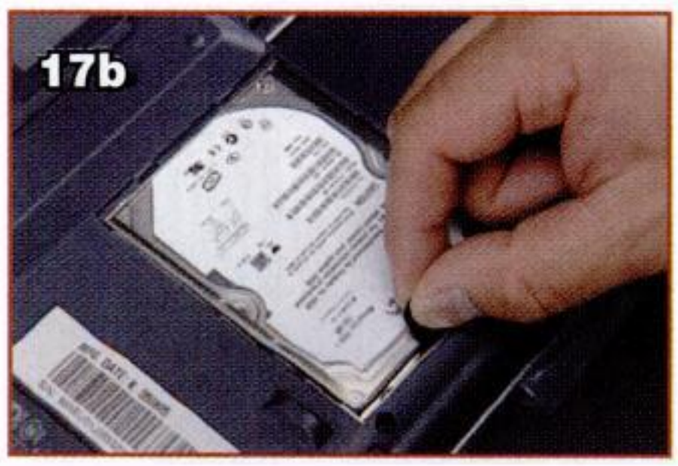
Once it's firmly in the slot, tilt the module down into place until the two retention arms lock. While you're here, reinstall the two screws from Step 3 that hold the middle panel in place. You should now replace the panel from Step 2 and reinstall all four screws.

Step 16: Open the Hard Drive Bay

Remove the hard drive bay cover, which is to the left of the battery compartment (image a). Pull out the hard drive caddy (image b). Because we're building a notebook aimed at midrange power instead of all-out battery performance, we selected a 7,200rpm, 100GB Seagate Momentus SATA hard drive.

Step 17: Mount the Drive

Mount the hard drive to the caddy using the screws provided by the kit. Our kit only came with two screws even though there were four holes. We split the difference and used one screw on the bottom and another on the side (image a). Then lower the entire caddy into the drive bay and slide it forward using the black tab on the caddy until you make a connection (image b). Replace the hard drive bay cover.



Step 18: Prepare to Remove the Optical Drive

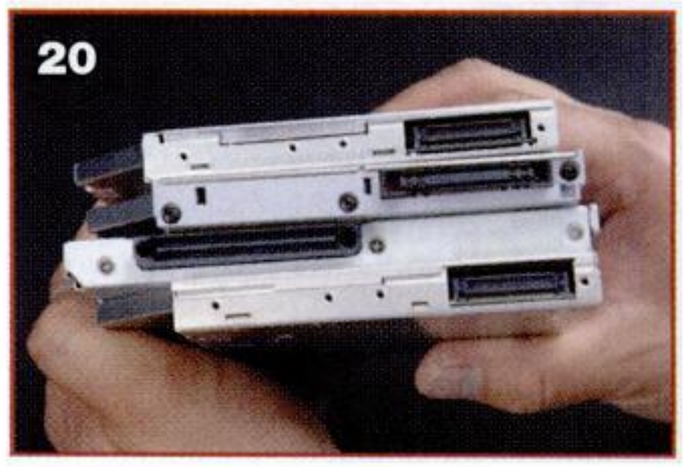
Now we need to replace the stock combo drive with a spiffy double-format, dual-layer burner. To begin, remove the screw next to the foot of the optical drive.

Step 19: Use Your Fingernails

Slide the drive out of its housing. Your fingernails should do the trick, but you might need to use a flat screwdriver to pull the old optical drive out of bay.

Step 20: Underneath, They're All the Same Connector

On the top we have the original Philips combo drive that came with the AOpen kit. Under that is a Fujitsu drive, then an older Compaq Armada drive, and finally our new 8x NEC ND-6750A burner that we picked up from Newegg.com for $80. Although the Fujitsu and Compaq look like they have different connectors, they're really the same—you just have to remove the proprietary attachments. Why the different connectors? Compaq, Fujitsu, and the rest use modular bays for floppy drives, batteries, and other accessories, which require different pins and power than a standard slim optical drive. Luckily, our AOpen chassis uses a standard slim optical interface so there's no need to tinker with the connectors.



Step 21: Convert the Bezel

The bezel, however, is unique for each notebook, so you'll need to switch the stock unit on the NEC drive with the one that came

Continued on page 52

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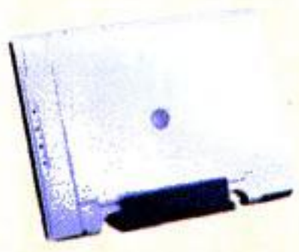

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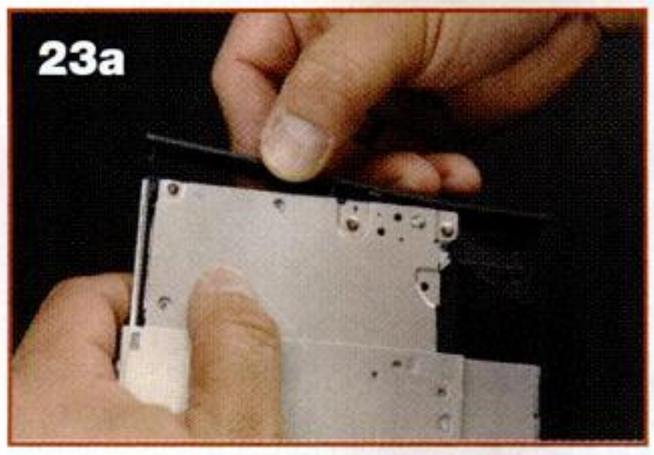
with the laptop. Otherwise, the bezel won't be flush with rest of the laptop. Not all slim drives use the same bezel type, but fortunately for us, ours did. To remove the bezel from the stock Philips drive, first open the drive door using a bent paper clip.

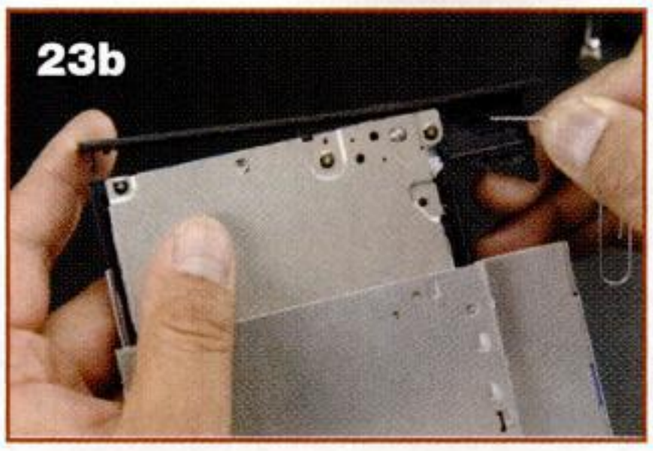
Step 22: Unlock and Remove the Bezel

Remove the bezel by pushing in on the locking tabs with a paper clip. You'll need to push fairly hard to get the bezel to release. Once the tabs are loosened, you should be able to pop the bezel right off.

Step 23: Replace the Bezel on the NEC Drive

Now you'll need to remove the bezel from the NEC drive and pop the new one into

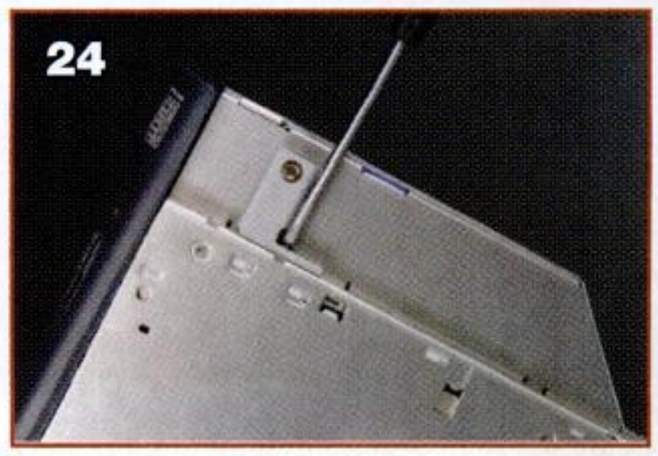




place. You'll need to follow the exact same procedure to get that bezel off (image a), then pop the one that matches the notebook chassis onto the NEC drive (image b).

Step 24: Insert the Optical Drive

The last step in our drive transplant operation is to remove the metal arm that locks the drive into the notebook. Simply unscrew the single screw holding it in and



move it to the NEC drive. You're ready to slide the drive back into the machine. Remember to reinstall the screw you removed in Step 18.

You're Done!

Install the battery, plug in the machine, and fire that baby up! Once you've ensured that your machine is booting properly, and that all the hardware seems to be working, you can pop your Windows CD into the drive and install Windows XP!

MXM Module Could Make Graphics Upgrades Easy

We chose the AOpen 1559 because it comes with the moderately powerful GeForce Go 6600 graphics, but it also has the potential to upgrade to a faster GPU down the road, thanks to its MXM I module. AOpen ships the notebook with the module, which is a good thing because stand-alone modules are nearly impossible to obtain. We're going to show you how to remove and upgrade the card on the off chance there will be an upgrade path one day.

Step 1: Remove Heatsink/Fan

The GPU is near the memory modules, so you'll need to open that compartment on the bottom of the laptop. The GPU is also cooled by a heat pipe, which you'll need to remove before you continue. Unscrew the single screw holding down the heatsink.

Step 2: Slide the Fan Out

With the screw removed, slide out the fan in the direction of the GPU until the tab holding it down is clear. You can now move the fan out of the way.

Step 3: Unscrew the Heat Pipe

Remove the heat pipe by removing the four screws clamping the pipe to the MXM module.

Step 4: Behold the MXM!

You can now remove the MXM Type I module by releasing the clasps, tilting it up, and pulling it out. The mounting is very similar to the SO-DIMM and Mini PCI card—insert the card edge into the slot at an angle and push it in until it stops and then tilt the card down. Will we one day get a GeForce Go 7800 card in this size that runs cool enough for our heat pipe to manage? No one knows, but we sure hope so.

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Don't Panic!

Rarely does a machine work on the first try, even for *Maximum PC* editors. Don't freak out, and don't call tech support yet. Here are a few common problems, and easy solutions if your machine won't boot.

Problem: My new notebook won't boot.

Solution: Assuming you didn't bend or break anything while you were building your notebook, the first thing you need to do is check the power switch. You should pop the middle panel loose and check to make sure you reattached the power leads or didn't accidentally disconnect the power lead from the motherboard during the build. If those are intact, you might have to reseat the processor or GPU (if you removed it.)

Problem: My notebook will start to beep but immediately shuts down a few seconds after boot.

Solution: It's likely the processor is overheating as the result of an incorrectly installed heat pipe. You'll need to break the machine down and reseat the CPU and cooler. First, remove the middle panel and keyboard to access the processor and heat pipe. Make sure you tightened down the heat pipe properly, but don't overdo it. Remember, the Pentium M doesn't have a heat spreader to protect its delicate little core. Get too physical with it and you could crack the core. Also make sure the thermal pad—the little tab that looks like gum—is in place.

Problem: My wireless is not working or has poor reception when I'm standing next to my access point.

Solution: First make sure the wireless is turned on. Press the first button to the left of the keyboard to turn on the wireless. You can also set the machine to boot with the wireless enabled from within the BIOS. If wireless is enabled, the antenna lead or leads might have popped off during assembly, or might not have been securely fastened during the build. Follow the steps to remove the middle panel and keyboard to access the Mini PCI slot and antenna leads, and check the leads. If Windows isn't even detecting the Wi-Fi (and you loaded the drivers from the CD), you should reseat the Mini PCI card.

Problem: My notebook will not go into an S3 sleep mode.

Solution: First, make sure you're using an OS that fully supports ACPI modes. Windows 98, Millennium, and 95 have problems with S3, or "suspend to RAM" sleep modes, while Windows XP and Windows 2000 offer full support. If you're running a 9x-based OS, it's time to upgrade, baby. If you're running XP or 2000, your problem may lie with drivers, or something as odd as a Direct3D screen saver, such as the 3D Text that's included with XP. Microsoft has a hotfix for this problem, under Knowledge Base item Q306676. Or you can just switch screen savers. Otherwise, most sleep problems are directly related to bad device drivers. The drivers AOpen includes fully support standby and hibernate modes under XP, so if you're running a USB, PC Card, or ExpressCard device, you may want to remove it and its drivers to see if the issue corrects itself.

Problem: Even though the BIOS sees the SATA drive, Windows XP can't install to it during installation.

Solution: If you have the BIOS set to configure the SATA and PATA ports as "enhanced." You can get around the problem by setting the BIOS to "compatible." Alternately, you can dredge up a USB floppy drive to install the F6 drivers for the onboard SATA controller. MPC

DIY vs. Prebuilt

Is there really anything our DIY rig offers over the OEMs? The answer is a definite yes!

We'll admit that the idea of building our own notebook seemed pretty impractical at first, but our DIY rig sports two features we've never seen from a prebuilt notebook, one of which we've wanted for years. The first is a six-pin FireWire port. The overwhelming majority of notebooks sport the nonpowered four-port variety. While the heyday of FireWire is long past, a powered-port lets you run more bus-powered devices, and if you ever need to flash the firmware on you iPod, you can do it from your six-pin port. Our notebook also includes support for both the new ExpressCard interface and the older PC Card standard. Most ExpressCard notebooks (even the Dell reviewed this month) simply jettison the PC Card from the chassis. That's just a little too legacy-free a little too soon for us.

We're also quite satisfied with our configuration. For $1,500, we get a notebook that performs at the top of its class in single-core processor speed (for benchmarks see this month's In The Lab on page 66) and we get a Shader Model 3.0-capable GeForce graphics part, too. That's pretty hard to do in a $1,500 retail notebook. More importantly, when Microsoft Windows Vista ships later this year, we'll have full accelerated support for the Aero interface that most integrated graphics can't support.

Combine the configuration, features, and price with the fact that we built it ourselves, and we're just tickled pink over our DIY notebook.

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Outfit Your Workstation **Ergonomically**

Ergonomics affect everyone, especially if you sit at your computer for extended periods of time. You don't need an in-home expert if you follow a few simple rules to keep yourself healthy

TIME 00:45 HOURS:MINUTES

Believe it or not, the proper way to sit while working at your computer is *not* reclining against a beanbag on the floor with a keyboard in your lap. Ergonomics isn't just for corporate cube dwellers. Everyone needs a comfortable workspace—and if you're in front of your computer as much as we are, this is doubly true.

If you're one of the millions of PC users who experience frequent wrist, neck, or back pain, properly setting up your workstation is something you need to do now. Pain and discomfort can get better, but only if you take steps to improve your environment and consult a doctor. If you haven't had any workstation-related pains, optimizing your desk can prevent them from ever occurring.

We've done all the research for you. We consulted a variety of ergonomic experts to compile our most complete list of ergo advice ever: Dr. Nancy Baker, an occupational therapist with the University of Pittsburgh; Michael Abramson, co-founder of HealthyComputing.com; and chiropractor Pam Adams of Life Chiropractic College West. Spend 10 minutes and take their advice. Your radiocarpal joint will thank you!

BY CHRISTOPHER **NULL**

Setting up Your Chair and Desk

Experts agree that your chair is the single most important piece of equipment in your ergo-arsenal, so if you can afford it, spring for the works. Your seating scenario needs to fit both you and your environment, which means you need a chair that's as adjustable as possible. Here's how to adjust the chair:

- Adjust the seat height until your arms bend at a 90 degree angle when your lower arm is level with the keyboard. If your desk is too high, consider installing a keyboard tray underneath the desk, which can make this adjustment much easier.

- Now, if you're very short, your feet may be dangling. Add a footstool or some other stool-like object so your legs are supported.

- Sit back in the chair so your entire back is supported from the shoulder blades on down. Again, if you're too short for the chair and you can't use the back rest without your feet hanging down, place a cushion behind you. A lumbar support is great if your chair has one. If not, try putting a rolled up towel between your lower back and the backrest.

- Finally, adjust the armrests so they support your elbows at the 90 degree angle you set up previously. Don't rest your elbows on the desk.

As for posture, sit up straight or recline a bit, whatever works for you. The important thing is that you're comfortable and that the critical points of your body are supported and aren't subject to constant stress.

As a final note, remember that the area under your desk shouldn't be a storage space. Keep it clear so you can move your legs and stretch them out from time to time.

Continued on next page→

Slouching and sitting with your monitor at the wrong height will add to already stressed areas, like your wrists.

In this picture, you can see that the monitor is at the correct height, and the wrists are aligned properly, which is both more comfortable, and safer.

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Continued from previous page

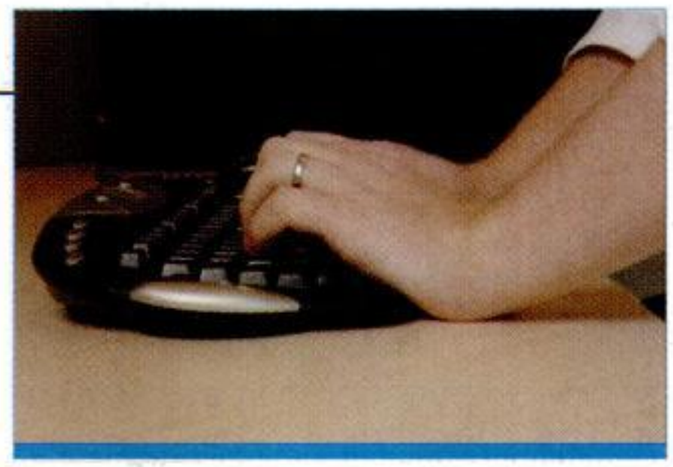
Setting up Your Keyboard

The goal with your keyboard is to keep your palm from twisting in any way, either back toward the wrist or side-to-side, toward the pinky or thumb. Lay your hand and wrist flat on the desk with your fingers curled, as if lightly holding a ball. This (called the "neutral position") is how your hand should look when you're typing.

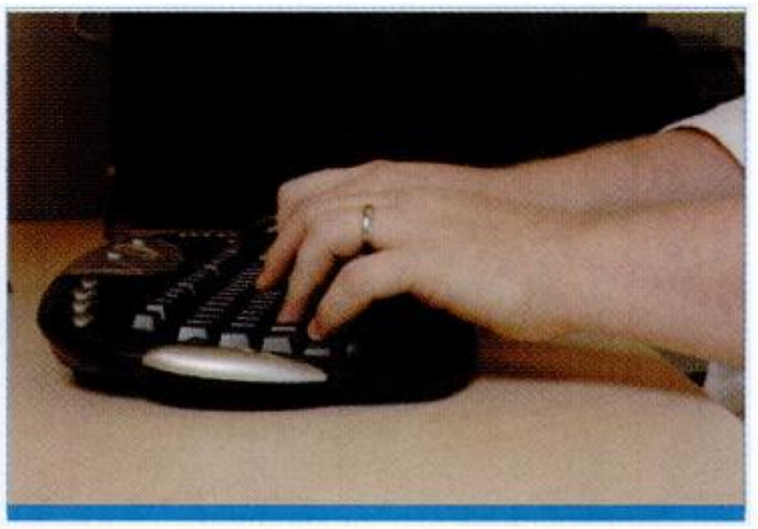
To get your hand in the neutral position, first you'll want your keyboard as level as possible. Don't use the tabs on the underside to raise the rear of the keyboard, as this increases stress on the wrist by forcing an incline out of the neutral position. (Some fancy keyboards actually offer "negative tilt" and tilt away from the user.)

Next you want to get your arms as parallel as possible to avoid the twisting that will happen by forcing your fingers all together on a cramped, straight line. This is why split keyboards were invented, and if you're especially—*ahem*—wide and can't get your arms close together, try one out. Some people find these keyboards so hard to use, though, that they end up becoming stress creators instead of stress eliminators.

Finally, use a wrist rest if you type with your palms touching the desk, as most people do. Make sure it's made of a soft material, which will help eliminate stress on the palm muscles and bones.



If your wrists look like this when you type, you're in for a lifetime of pain and misery.



The tops of your hands and your forearms should make a straight line, as shown, if you've positioned yourself properly.

Setting up Your Mouse

Most ergonomic experts say a trackball is easier on the body than a standard mouse. The frequent movements that mousing entails can overwork the joints in your shoulder and part of the back, which is simply not designed for the small, precise movements that mouse work entails. A trackball relocates these movements to the fingers, which are better equipped for the strain.

Whether you use a mouse or a trackball, keep your mouse as close to your keyboard as possible. The further you have to stretch your arm to reach the mouse, the more stress you place on a whole panoply of muscles in your shoulders, upper back, and neck.

Again, whether you use a mouse or a trackball, position your armrest so your arm can remain at a 90-degree angle when moving the cursor. Make sure you keep your elbow supported as well.

Setting up Your Monitor

Reach your arm out directly in front of you. Drop your eyes about 15 degrees. That's roughly where the center of your monitor should be if you have good vision and a decent display. Try tilting the monitor back slightly in order to improve visibility.

The distance from your monitor to your eyes is flexible and is largely dependent on your eyesight and the size and resolution of the display. But if you're having trouble reading small text, try decreasing the resolution or consider getting your eyes checked before you start inching the monitor closer to your face.

The relative angle between your head and your display, however, is far more important than height and distance: Your monitor should be straight ahead of your body, not off in a corner. Some foolish people put their monitor to one side of their desk and crane their head in order to see it. This is one of the worst things you can do for your neck; a few hours of working like this will almost certainly land you in agony.

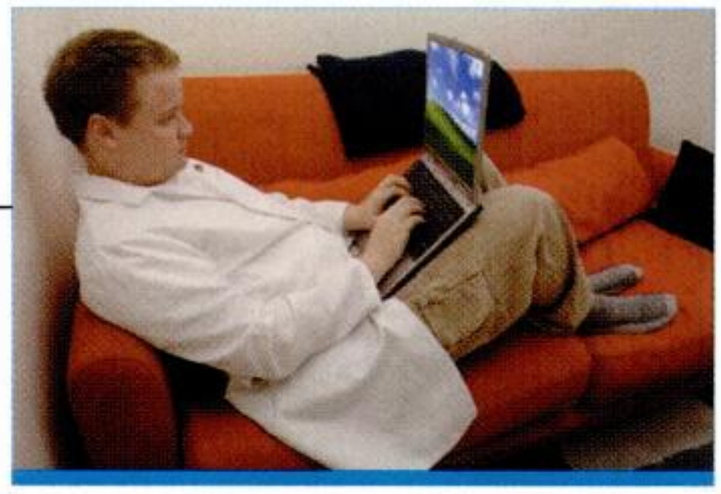
Special Concerns for Laptop Users

Laptops let you work and play anywhere, but their limitations can be murder on your body. We don't want to discourage you from using a notebook while you hang out on the sofa, but take a few precautions when you do.

Use your laptop at a table or desk if possible. This way you should be able to follow most of the advice in this article, aside from adjusting the screen height.

If you must flop on the couch to work (and we can hardly blame you), adjust your body appropriately so your plush comfort doesn't turn into awful RSI pain. If your laptop is indeed in your lap, make sure it's supported and isn't wobbling around when you type. Using a laptop tray like the Lapinator (**www.lapinator.com**) will help stabilize the machine while keeping your bits and pieces from getting too hot, which can cause serious fertility problems (gulp!) in addition to uncomfortable sweatiness in the pants department.

Next, support your arms. It's easier than you think. Just take the pillows from the couch and wedge them on each side of you, under your elbows. Finally, tilt your monitor back a little more, to alleviate some of the strain your neck experiences by having to bend so far.



Using a laptop on the sofa can be crippling. It's crucial you find just the right position to get your wrists properly aligned.

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Splints and Braces

Do arm braces and splints do any good? The logic behind these products is that they force you to keep your wrist in a healthy computing position, so you don't have to consciously think about maintaining the appropriate posture. And if your doctor has prescribed wrist splints for you, you should definitely follow her instructions.

But for many people, splints and braces can do more harm than good. Many users self-diagnose carpal tunnel syndrome and buy drugstore splints at the first sign of pain. But using them soon becomes problematic, as the splints interfere with "good" motions along with "bad" ones. The result is that wearers can fight and strain against the splint, causing them to overcompensate to make what would otherwise be a simple movement. This can actually make pain worse instead of better.

Unless a doctor directs otherwise, spend your time and your money on properly configuring your workstation instead of buying splints.

Breaks, Stretching, and Exercise

After a long, cramped flight, you stand up and feel sore. Staying in one position for too long—no matter what you're doing—is bad for your bod. It's important to remember to move a little, even if you're in the eighth hour of that *World of Warcraft* session.

Experts offer a variety of tips on how often you need to move around. HealthyComputing.com posits the 20/20/20 rule: Every 20 minutes look away from your monitor for 20 seconds, and look at something at least 20 feet away. But Baker says that you should actually stand up every half hour and do some kind of stretching or walking around. You might as well combine the two and take regular, 20-minute breaks if it's at all possible. Get a drink, take out the trash, eat a Cheeto. Just do something to keep your muscles limber.

Throughout the day (or night), fiddle with your workstation. Make tiny modifications by tilting the monitor a bit, moving the keyboard slightly closer to you, or raising your armrests slightly. This gets your body into different positions and keeps you flexible.

As for stretching, you can find a variety of stretching regimens online and in books written specifically for computer users. But Adams offers "the most important stretch" she gives her patients, the chin press.

"Sit on the edge of the chair, feet flat on the floor. Lift the breastbone upwards and tuck the chin into the throat as if you were soldier standing at attention. This should be uncomfortable but not painful. Count to 10. Relax. Repeat whenever you feel tension in your neck, upper back, or shoulders."

Try it. It works!

When to See a Doctor

Despite the horror stories and media reports, carpal tunnel syndrome isn't as common as you might think. Your hand might hurt because of a neck problem, with pain referring down your arm. You might just be sore from doing a lot of work, and tomorrow it could pass. Self-diagnosing yourself with serious illnesses is unproductive and dangerous.

When should you give in and see a professional? Occasional discomfort that goes away soon after you've finished working is generally OK. It's when problems get more severe that you need to make an appointment with a physician. Specifically, if you:

- Experience constant pain that doesn't get better quickly after you stop using the computer.
- Wake up at night in pain.
- Find that your fingers are turning blue or feel cold to the touch.
- Experience numbness in your extremities (any numbness calls for an urgent response).

In a nutshell, if you experience any chronic pain in the fingers, neck, or back, pain that feels severe, or pain that keeps recurring, it's time to see a doctor. Tell her *Maximum PC* sent you. MPC

MAXIMUM PC 2006 READER SURVEY

Fill It Out, Mail It In, and Win!

We want to know what you think of *Maximum PC* magazine, so we can do more of the stuff you like, less of the stuff you don't like, and add whatever you think is missing. Please check the box of the answer that best fits, except when instructed to do otherwise. Fill out the form below and send it to: *Maximum PC Reader Survey #2, 4000 Shoreline Ct., Ste. 400, South San Francisco, CA 94080.* All submissions received before April 20 will automatically be entered in a random drawing to win the Cooler Master CM Stacker 830 case (pictured here). Photocopies of the survey will not be accepted. (Turn to page 109 for contest rules.)

Name_____

Phone number_____

Email_____

(The above information will only be used to contact the winner)

1. Where did you get this magazine?

❒ I'm a subscriber
❒ Bought it at a discount chain (Wal Mart, Target)
❒ Bought it at a newsstand/bookstore (Barnes & Noble, Borders)
❒ Bought it at a supermarket (Safeway, Kroger)
❒ Friend passed it on to me

2. How many issues of *Maximum PC* do you usually read per year?

❒ All of them!
❒ 6-12
❒ 2-6
❒ This is the first time I've read *Maximum PC*

3. On a scale of 1 to 5 (1 being the best, 5 being the worst) how would you rate your interest in the following topics?

____ PC games
____ Gaming hardware
____ Digital photography
____ Digital video how-to projects
____ Digital media (music, movies, etc)
____ Digital rights management
____ Music creation
____ Video creation
____ Ripping CDs and DVDs
____ Hardware reviews
____ Hardware buyers guides
____ Software reviews
____ Using Linux
____ Using Mac OS X

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MAXIMUM PC 2006
READER SURVEY

Continued from previous page

____ Windows tips
____ Make Windows faster
____ Protecting your PC
____ Spam prevention
____ Spyware prevention
____ Wireless networking
____ Fix your PC
____ Build your own PC

4. Do you find the tone of the writing to be:
❒ The right mix of fun and informative
❒ Too serious
❒ Too silly

5. Do you find the content of the magazine to be:
❒ Below your level of expertise
❒ Just right for your level of expertise
❒ Difficult to follow

6. How would you rate the content of the disc?
❒ Too many games, not enough apps/utilities
❒ Too many apps/utilities, not enough games
❒ Not enough content, period
❒ The disc is just right
❒ I don't get the disc

7. Rate the following sections of the magazine, where 1 = I like it; 2 = I neither like nor dislike it; 3 = I don't like it:
____ Quick Start
____ Head2Head
____ Watchdog
____ How-To
____ Ask the Doctor
____ R&D (White Paper)
____ R&D (Autopsy)
____ R&D (Previews)
____ In the Lab
____ Reviews
____ In/Out
____ Rig of the Month

8. Do you prefer stories that:
❒ Tell you how to do something *to* your PC
❒ Tell you how to do something *with* your PC
❒ Inform you of new technologies and products that will be available in the future
❒ Inform you about products available for purchase right now

9. Do you build or buy your PCs?
❒ I build my own
❒ I buy prebuilt

10. Which cover line is most interesting to you:
❒ Copy Your Movies and Music
❒ Build Your Own Laptop
❒ Tested: Radeon X1900
❒ Blu-ray vs. HD-DVD
❒ Wi-Fi Wonders

Ask the Doctor

Diagnosing and curing your PC problems

TWO HEADS BETTER THAN ONE?

I'm building an Athlon 64 system with an Asus A8N-SLI Premium motherboard, an AMD 64 4000+ CPU, 2GB of OCZ PC 4000 DDR500 memory, a Maxtor 300GB SATA hard drive, a Plextor PX716SA/SW SATA optical drive, a Sound Blaster X-Fi Xtreme soundcard, and an Antec TX640B case. Would I get better performance with one nVidia 7800 GTX, or two 7800 GTs? If two GTs is the answer, will I need to upgrade the power supply?

—Warren Hunter

You're building a powerful system, Warren, and we were with you all the way up to your choice of enclosure. While there's nothing wrong with Antec's TX640B case, per se, the power supply that comes with it is insufficient for dual-video-card configurations. Two GeForce 7800 GT cards in SLI will outperform any single GeForce 7800 GTX card—even the 512MB variety—but you'll need at least a 500-watt PSU to drive them.

If you're going to run dual videocards—either CrossFire or SLI—make sure your power supply is strong enough to handle the load.

ALL QUIET ON THE DVD FRONT

I'm experiencing strange problems with my computer's DVD burner. My PC's BIOS doesn't recognize the drive at first. The drive appears when I go into the BIOS to fix the problem, but it refuses to save this configuration to memory. Windows XP nonetheless "sees" the burner just fine, and it plays audio CDs, but I don't hear any audio when I use it to play movies. The fact that the CDs and DVDs I've burned with it play on stand-alone DVD players serves only to compound my confusion. I've updated all my drivers, I've flashed the PC's BIOS with the latest version, and I've even changed DVD burners—all to no avail.

—Patrick Polizzi

Your audio problem could be related to your DVD software. If you set up the player to output digital audio, for instance, you won't hear anything from analog speakers. Poke around in the program's configuration menus and make sure its audio settings match your speaker system (2.1- or 5.1-channel analog, for instance). As for your DVD drive, disconnect each end of its ribbon cable and check for bent pins on the motherboard and on the drive; if you find any, straighten them very gently. If that doesn't solve the problem, set the master/slave relationship using cable select, as opposed to a manual configuration. If you're *still* having problems, try swapping out the ribbon cable.

ANTEC ANTICS

*Recently, while playing **Call of Duty 2**, my video display became corrupted and then my entire PC crashed. Rebooting and restarting the game didn't solve the problem, so I booted in Windows' Safe Mode and reinstalled my video drivers. Believing my videocard to be the problem, I swapped it out for an old TNT-2 card and everything worked fine (except for the serious lack of performance). I described this state of affairs to BFG's tech support, and they promptly issued an RMA and replaced the card. The only problem is that I experienced the exact same problem when I installed the new card. Next, I tried something I should have done before I blamed my problem on my videocard: I plugged a different power cable into it and everything worked fine. So, should I replace my Antec power supply, or just stop using that particular rail?*

—James Frankford

Well, that just goes to show you that things aren't always what they seem. If you don't need to use the power supply's "bad" rail, mark the cable with some brightly colored tape and tuck it away inside your case. If you don't like the idea of leaving a bad rail hanging around inside your case (or if you're going to need it at some point), replace the PSU. Don't toss

Is your PC taunting you with error messages, ill-behaved software, and recalcitrant hardware? We've got good news for you: The Doctor is in! Drop him a line at **doctor@maximumpc.com** with details related to your problem, and he'll prescribe a concoction that's sure to ease your pain.

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your current PSU—it might come in handy for troubleshooting in the future.

POST TOASTIE?

My Abit SR8-7X motherboard died on me after two years of service, and Abit—to its credit—replaced it under warranty. The only trouble is that I can't get the new board to get past the POST—it keeps giving me a "CPU has changed, go to setup" error message. I replaced the 2.8GHz Pentium 4 with an identical part, but it still gives me the same error message. I even asked Abit to send me a third motherboard—which it did—and installed both CPUs in it. I got the same result, even after resetting the BIOS. Upgrading to a newer-model motherboard is not an option, because it would also entail replacing the CPU and the 1.5GB of memory I already own. Any help would be greatly appreciated.

—Paul Lichtenstein

The Doc can't find any info on Abit SR8 mobos, so he's going to assume you actually have an Abit SR7-8X. The first step in your recovery should be to download and install the latest BIOS. Once you've flashed the BIOS, perform a "load defaults" and save the changes (you should also make sure you don't have any auto-overclocking features enabled). If the board is still giving you the error message, try replacing the CMOS battery. If that doesn't do the trick, make sure the board is correctly identifying the installed CPU, and verify the BIOS' CPU configuration (the correct setting for your CPU is a 21 multiplier x 133MHz front-side bus. Set the multiplier manually, if you have to). If none of these steps solve the problem, search the BIOS settings for a halt-on-errors feature. If it has one, set it to "halt on none" and the POST should skip right over the spurious error message.

NORTH, TO ALASKA!

*I just bought a new Dell Dimension with a fast processor, a good Sound Blaster card, acres of memory, and a bottomless hard drive. I've used **MusicMatch Jukebox 9.0** to rip music at 64Kbps (**Jukebox** calls this "CD Quality"), and some of it sounds great, but a lot of it sounds distorted and sub par. I have good ears—I DJ and produce for KHNS-FM, in Haines, Alaska—and I can't figure out why these files sound so bad. Can you offer any insights?*

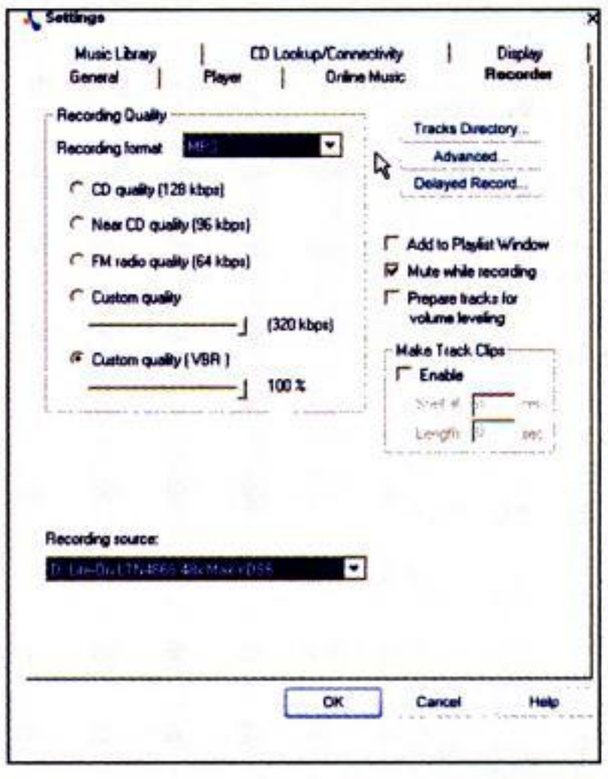
—Mike Bradac

Ripping audio from a CD and encoding it to any format other than uncompressed WAV

SECOND OPINION

You said in your February column that there's no way to convert component high-definition video—such as from an Xbox—to a VGA signal that can be displayed on a computer monitor. But I've found a product that does just that: The VD-Z3 Component-to-VGA Transcoder ($60), from V-Digi Electronics (**www.vdigi.com**). And if you want to uses your PC mouse and keyboard to control your Xbox, you might try the Smartjoy Frag ($20), from Lik-sang (**www.liksang.com**).

always entails a trade-off between file size and audio quality. Using low bit rates results in smaller files, but the intense compression also results in music that sounds like crap. It's no surprise that you're unhappy with the audio quality you're getting by ripping at just 64Kbps—you're losing a lot of detail at that rate. The Doctor recommends ripping at a minimum rate of 192Kbps. If you're concerned about file sizes, consider enabling the software's variable bit-rate option. In this scenario, more space will be used to store complex passages, and less space will be used for simpler segments. You might also consider using one of the lossless codecs, such as FLAC; just make sure the playback devices you intend to use also support that codec. (For more about ripping flawless MP3s, see page 30). MPC



Ripping digital audio tracks requires you to strike a balance between quality and storage consumption. Using variable bit rates comes close to delivering the best of both worlds.

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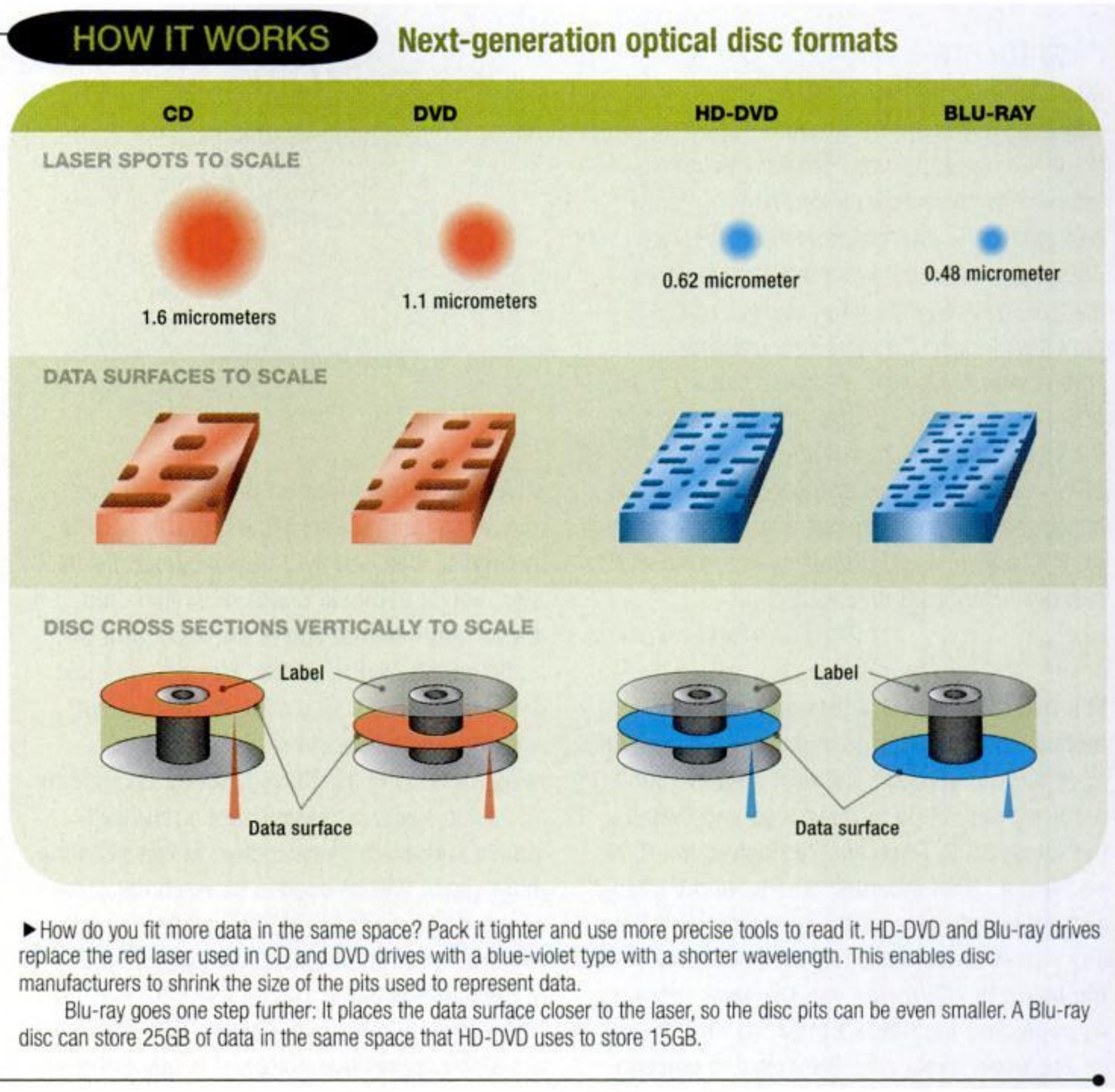
White Paper: Blu-ray and HD-DVD

The battle for supremacy of the next generation of optical-disc technology is about to begin. Here's our pre-fight analysis of the competing standards

BY GORD **GOBLE**



▶How do you fit more data in the same space? Pack it tighter and use more precise tools to read it. HD-DVD and Blu-ray drives replace the red laser used in CD and DVD drives with a blue-violet type with a shorter wavelength. This enables disc manufacturers to shrink the size of the pits used to represent data.

Blu-ray goes one step further: It places the data surface closer to the laser, so the disc pits can be even smaller. A Blu-ray disc can store 25GB of data in the same space that HD-DVD uses to store 15GB.

The consumer electronics market hasn't seen a fight like this since the legendary Betamax vs. VHS wars of the 1970s. In one corner, we have HD-DVD, developed by Toshiba and NEC and supported by a coalition of heavyweights including Universal Studios, Intel, and Microsoft. And in the other, we have Blu-ray: a Sony invention endorsed by an equally impressive roster including Disney, Fox, Apple, and Dell.

The prime impetus for both technologies is storage capacity: Current-generation DVDs are inadequate for high-definition video. The two technologies share a number of characteristics, too: Both use media that, from all outward appearances, looks identical to today's CDs and DVDs. Both replace the red laser used in CD and DVD drives with a blue-violet laser. And both promise massively increased storage capacity.

But that's where the similarities end: The two technologies are fundamentally different and—more importantly—fundamentally incompatible. And once consumers voice their preference (a decision that will undoubtedly be shaped by the actions of movie studios and hardware manufacturers), it's quite probably game-over for the other contender.

THE LOWDOWN ON HD-DVD

HD-DVD is a far more evolutionary technology than Blu-ray. An HD-DVD is 12cm in diameter, just like a DVD, with a 1.2mm-thick substrate sandwiched between two 0.6mm-thick layers of transparent polycarbonate. A single-sided disc features a reflective data layer on one side of the substrate, with a shallow spiral groove extending from the hub to the outside edge of the disc.

If you were to examine this groove under a microscope, you'd see that it consists of a sequence of microscopic "pits" and "lands," just like any other optical disc. Your disc drive spins the disc while projecting a finely tuned laser through the polycarbonate and onto the substrate. The pits absorb light and the lands reflect it; an optical pickup monitors the transitions between the two. HD-DVDs are capable of storing three times more data than DVDs thanks to the width of their grooves (commonly referred to as track pitch) and the size of their pits and lands.

With a track pitch of just 0.40 microns, an HD-DVD's grooves can be packed much more tightly together than those of a DVD, which has a track pitch of 0.74 microns. But the track pitch isn't all that's been shrunk; the pits on an HD-DVD disc are nearly half the size of a DVD: 204 nanometers each, compared to 400 nanometers on a traditional DVD. These factors contribute to an HD-DVD's ability to store 15GB of data in a single layer, compared to a DVD's 4.7GB-per-layer capacity. Add another layer to the same substrate and you double HD-DVD's capacity to 30GB; place a two-layered substrate on the other side of the disc and you get 60GB of capacity.

Smaller grooves and pits and lands require a higher-precision laser, and that's the second half of the equation for both HD-DVD and Blu-ray technology. While CD drives are equipped with a 780-nanometer wavelength red laser, and DVD drives utilize a 650-nanometer wavelength red laser, both of the next-gen optical formats use a 405-nanometer blue-violet laser for an even tighter focus. The numerical aperture of the optical lens through which the laser is directed is almost as critical as the laser's wavelength. As with microscopes, telescopes, and cameras, the larger the optical drive's lens aperture, the more light it will be capable of gathering and the more it will be

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capable of resolving detail. HD-DVD doesn't make a dramatic departure on this front: It uses a 0.65 numerical aperture lens, compared to 0.60 for DVD lenses.

HD-DVD discs will initially come in three different flavors: HD DVD-ROM (read-only media for prerecorded content, such as movies, music, software, and games); HD DVD-R (one-time recordable discs for video recording and data storage/backup); and HD DVD-RW (rewriteable discs). At launch, the recordable formats will only be available in single-layer format, but double-layer rewriteable will eventually be available. In order to ease the transition from DVD, HD-DVD's backers offer the concept of combination and twin-format media. Twin-format discs will carry HD-DVD and traditional DVD content on opposite sides of the disc; combination discs are single-sided discs with HD-DVD content on one layer and DVD content on the other.

These discs offer consumers a measure of future-proofing: They can buy movies that will play in standard definition on their existing equipment today, and then in high-definition when they upgrade their TVs and disc players down the road. Of course, this would also prevent Hollywood from selling consumers the same content twice, so we don't expect to see widespread adoption.

HD-DVD (and Blu-ray) will support two substantially more sophisticated video codecs (compression/decompression algorithms), in addition to the MPEG-2 codec supported by the DVD standard: MPEG-4 AVC, also known as H.264; and SMPTE VC1, a standard based on Microsoft's Windows Media Video technology. These more efficient codecs are essential to both formats' mission to deliver high-definition video on disc; neither format has the capacity to store an uncompressed, full-length movie in high definition.

THE SCOOP ON BLU-RAY

Blu-ray technology marks much more of a departure from the optical-disc technologies that precede it. Like HD-DVD, it will come in three formats: BD-ROM (prerecorded Blu-ray discs), BD-R (recordable media), and BD-RW (rewriteable media). As noted above, it will support the same video codecs as HD-DVD; but that's largely where the similarities end.

For starters, a Blu-ray disc is capable of storing nearly twice as much data as an HD-DVD. How is that possible? Rather than build on existing technology and accept its basic limitations, Blu-ray's inventors took more of a clean-slate approach. One of the key problems they attacked was birefringence, a condition in which the disc's polycarbonate layer refracts the laser into

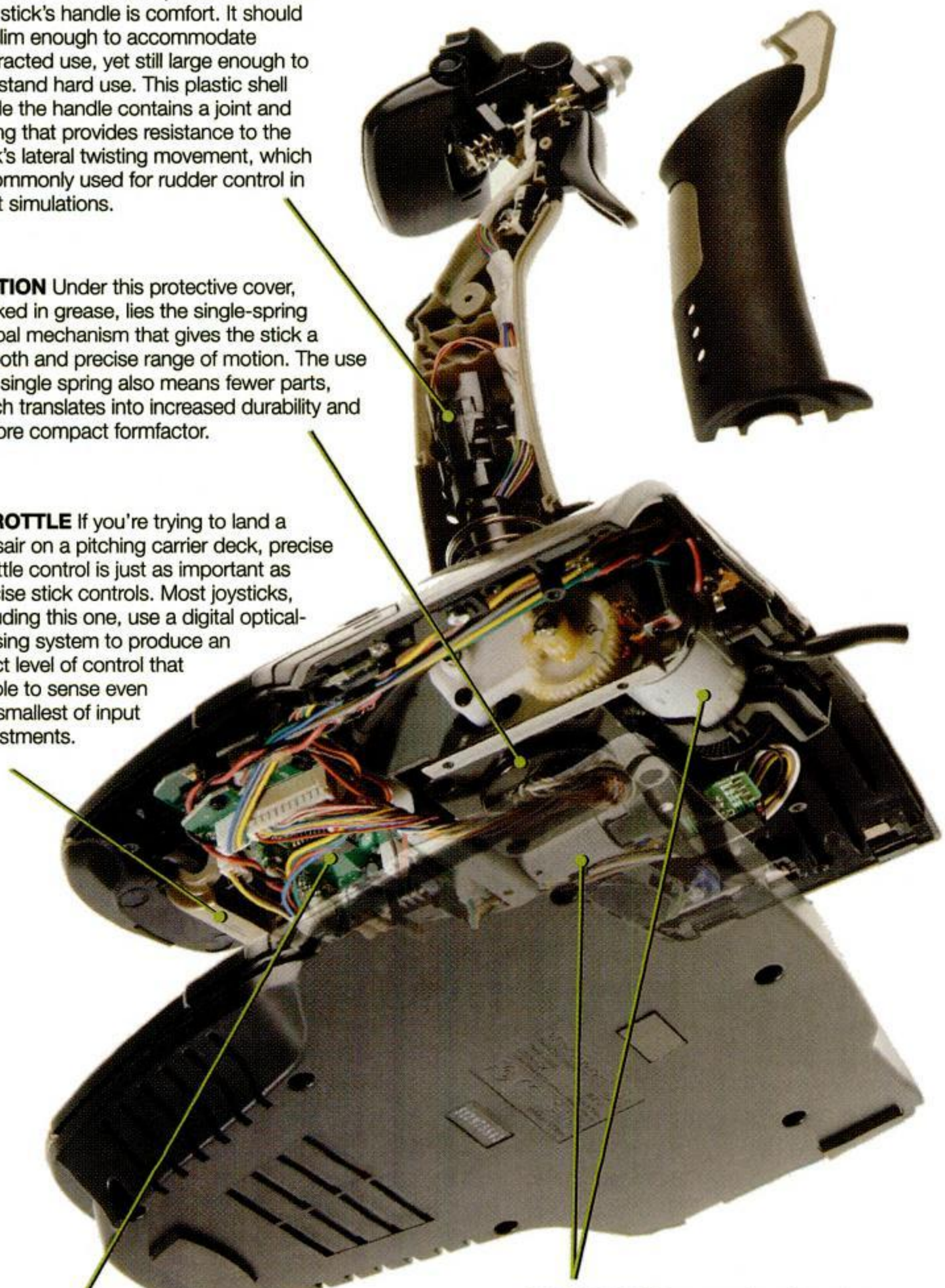
Force Feedback Joystick

The first force feedback joysticks were expensive, huge, heavy, and not the most precise controllers a gamer could ask for. That's all changed with current models. We hack into Saitek's Cyborg Evo Force to see what makes it tick

HANDLE The most important measure of a stick's handle is comfort. It should be slim enough to accommodate protracted use, yet still large enough to withstand hard use. This plastic shell inside the handle contains a joint and spring that provides resistance to the stick's lateral twisting movement, which is commonly used for rudder control in flight simulations.

MOTION Under this protective cover, packed in grease, lies the single-spring gimbal mechanism that gives the stick a smooth and precise range of motion. The use of a single spring also means fewer parts, which translates into increased durability and a more compact formfactor.

THROTTLE If you're trying to land a Corsair on a pitching carrier deck, precise throttle control is just as important as precise stick controls. Most joysticks, including this one, use a digital optical-sensing system to produce an exact level of control that is able to sense even the smallest of input adjustments.



THE BRAINS It might be green, but this circuit board is home to the stick's grey matter: the circuits, memory, and chipsets that translate in-game API calls into realistic force-feedback effects. This chip (behind wires) is a low-power, low-voltage 524,288-bit one-time programmable read-only memory chip that stores the data for the various force-feedback effects that the stick can model.

THE BRAWN Here are the twin motors that act in tandem to produce force-feedback effects on both a horizontal and vertical axis. Attached to the motor's axles are digital optical sensors, just like the one used to control the throttle input. So, the stick uses the same mechanism to measure the position on each axis as it uses to impart forces to the stick.

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two separate beams. If the laser's beam diverges too far, the disc will be unreadable. Moving the substrate on top of the polycarbonate—closer to the laser—and protecting it with a thin transparent cover layer virtually eliminates birefringence.

Measuring just 98 microns thick, however, that protective layer is so thin that the substrate is rendered extremely vulnerable to scratches. Dust and fingerprints are big problems, too. The initial solution was to enclose the Blu-ray disc in a protective cartridge, but this was deemed too clumsy for the worldwide market. It's therefore likely that Blu-ray disc manufacturers will place an even thinner layer of TDK's super-tough Durabis 2 coating on top of that cover layer; in fact, TDK began shipping such discs in December 2005.

Most everything else about Blu-ray is related to increased precision: A BD-ROM will have a much tighter track pitch than that of an HD-DVD: 0.32 microns, compared to 0.40 microns. This specification, in turn, requires a laser with a larger lens aperture: Both devices use a 405-nanometer wavelength blue-violet laser, but Blu-ray drives will be equipped with a 0.85 numerical aperture lens, compared to the 0.65 numerical aperture lenses on HD-DVD drives.

Pioneer's $1,000 BDR-101A PC drive will play Blu-ray discs, CDs, and DVDs. It will also burn discs at 2x speed for BD-R, 8x for DVD-R/+R, and 4x for DVD-RW/+RW.

The payoff for this extra research-and-development effort is capacity: A single-layer Blu-ray disc can store 25GB of data, and dual-layer discs will offer 50GB capacities. The Blu-ray Disc Association—an umbrella group for the companies spearheading Blu-ray development—is working on triple-layer discs that offer 75GB of storage, and quad-layer discs with 100GB capacities.

FIRST-GENERATION RETAIL PRODUCTS

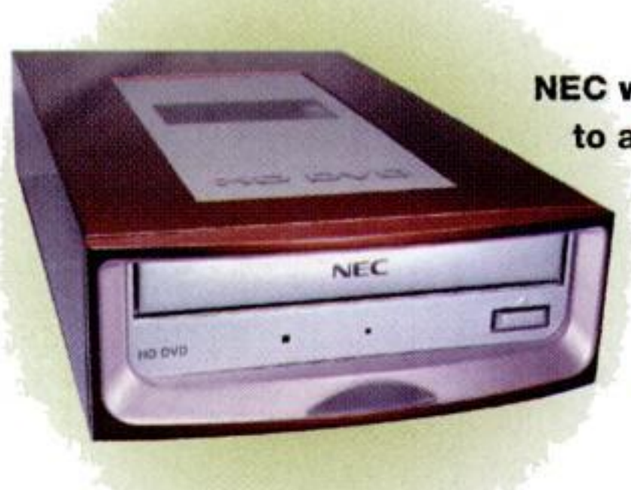
Spec charts are meaningless if you can't buy the product they describe, but if all goes according to plan, next-generation products should be on store shelves by the time you read this. They won't be cheap: On the Blu-ray front, Samsung's BD-P100—a stand-alone player for the consumer electronics market—will be priced at $1,000. It will read CDs and DVDs, in addition to BDs, but it won't record in *any* format. Pioneer's BDR-101A PC drive will play BDs, CDs, DVDs; and it will burn at 2x speed for BD-R, 8x for DVD-R/+R, and 4x for DVD-RW/+RW. It will be priced at $1,000 when it ships in March.

Toshiba, one of the prime movers behind HD-DVD, announced that its next Qosimo notebook PC will be the first to feature an HD-DVD drive. It will play HD-DVD discs and read and write CDs and DVDs when it ships in March. Toshiba expects to ship stand-alone HD-DVD players that same month. Details on HD-DVD PC drives are harder to come by. NEC announced its HD-DVD Multireader HR-1100A some time ago, but has yet to announce a ship date. The drive won't burn anything, but it will read HD-DVDs at 2x,

Toshiba's next Qosimo will be the first notebook to have an HD-DVD

DVDs at 8x, and CDs at 32x speeds.

It should surprise no one that Sony will equip its upcoming PlayStation 3 with a Blu-ray drive capable of playing high-def movies and games. The drive will also read DVDs and CDs. When Microsoft settled on a November 2005 launch date for the Xbox 360, it had to equip the device with an optical drive capable of reading only CDs and DVDs—HD-DVD drives just weren't available. But Bill Gates used his 2006 CES keynote speech to announce that Microsoft would offer an external add-on HD-DVD drive some time this summer. MPC



NEC was first out of the blocks to announce an HD-DVD disc drive for the PC, but the company has since become very quiet about the HD-DVD Multireader HR-1100A.

THE INSIDE SCOOP ON NEXT-GEN DRM

Movie producers and other content developers don't want anyone ripping off their goods, so they've convinced the Blu-ray and HD-DVD developers to incorporate new anti-copying technology. If the past is a reliable indicator, however, these efforts will do more to thwart consumers' rights than to prevent widespread piracy.

Blu-ray and HD-DVD will both make use of Advanced Access Content System (AACS), a new copy-protection scheme developed by a consortium of companies that includes Intel, Microsoft, Sony, Toshiba, Warner Brothers, and Disney. AACS was developed exclusively for next-generation optical discs, and it revolves around encrypted content that can be unlocked only with dynamic "keys." All BD and HD-DVD devices will have a set of keys that can unlock the data on BD and HD-DVD discs. If one of these device keys becomes compromised, it can be revoked and that device will be rendered incapable of reading new discs (because the new discs won't include the compromised keys).

In January 2006, the AACS consortium moved to further impede copying of high-definition content by requiring hardware manufacturers to down-convert (to 960x540 resolution) any HD content sent to a display device over an analog connection. The problem, as the consortium sees it, is that their high-powered encryption falls by the wayside as soon as the video signal is converted to analog. Unfortunately, this will render any HDTVs shipped without HDMI ports virtually useless.

But wait, it gets worse. HD-DVD *also* requires a display to support Intel's HDCP (High-bandwidth Digital Content Protection) standard. These developments spell big trouble for early HDTV adopters who own sets equipped only with component analog video inputs. The same goes for anyone who wants to watch HD video content on a computer monitor—any display that's not equipped with a DVI-HDCP port will be incompatible with HD-DVD drives. The same will be true of Blu-ray if that camp follows the HD-DVD group's lead.

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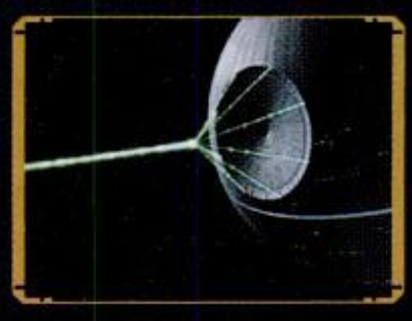

TEEN
T
CONTENT RATED BY ESRB
Fantasy Violence

Game experience may change during online play.

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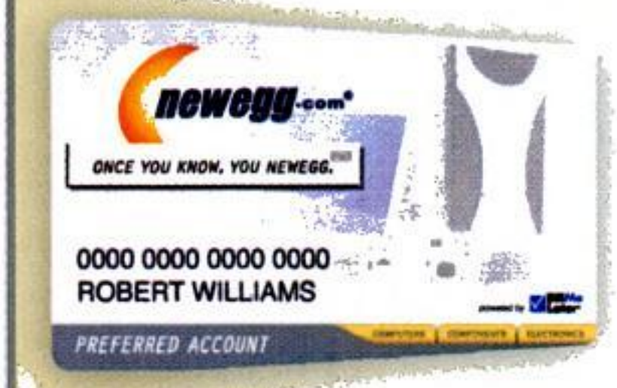

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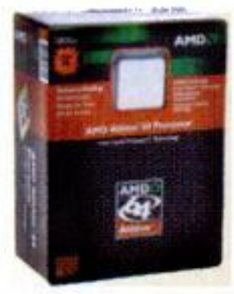

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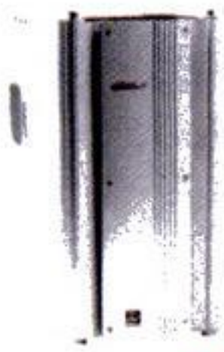

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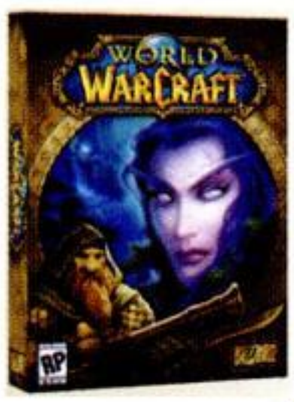

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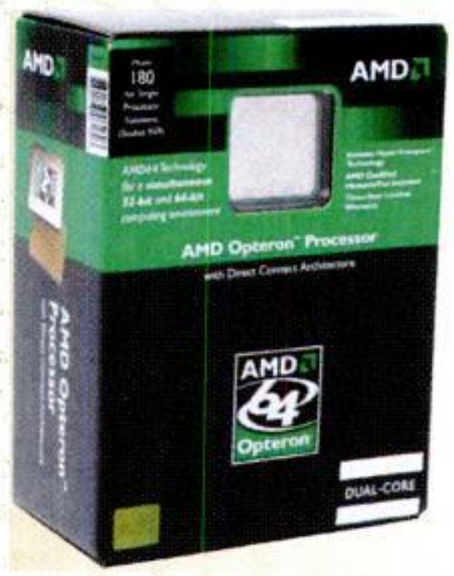

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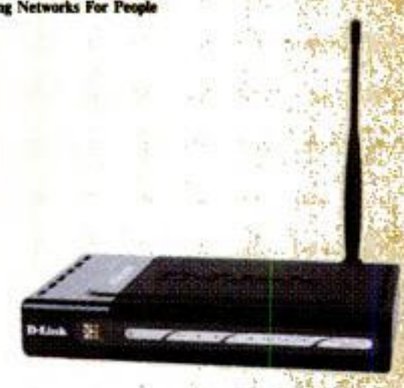

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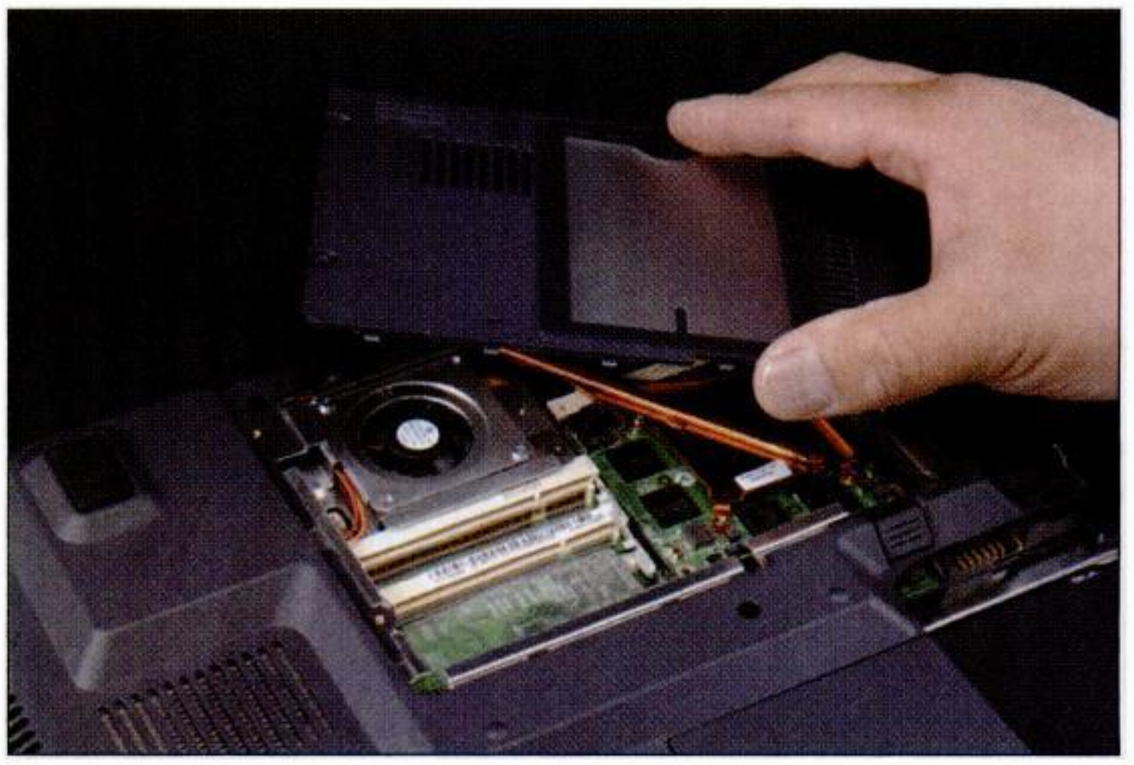
Puts the DIY Laptop Through Its Paces

Can our home-built notebook take out Dell's new Core Duo Inspiron?



What do you do with a notebook after you've built it? Benchmark it!

I was tickled pink to have built a feature-rich notebook for a mere $1,500 (see page 40). But how does this baby perform? To find out, I put our new wunderkind through our set of standard notebook benchmarks and compared the results to this month's Dell E1705 with its 2GHz dual-core Core Duo proc, as well as to a second-gen XPS notebook that has the same 2.13GHz Pentium M CPU as the DIY.

While the DIY didn't do poorly in *SYSmark2004*, the Dell E1705 simply screams (for a notebook, that is). Between its dual-core design and its large 4MB cache, the E1705 holds its own in most benchmarks. But the dual-core pays huge dividends in the multithreaded *Recode* and *DVD Shrink*. The Core Duo was almost 50 percent faster than the Pentium M, and in *DVD Shrink* we saw nearly a 100 percent performance increase!

OK, our rig got its ass handed to it by Dell's dual core, but it didn't do so badly against the second-gen XPS. Our $1,500 DIY was actually slightly faster than the $3,400 XPS in *Premiere Pro* and *Photoshop CS*. Why? The hard drive, bubba. Our 7,200rpm Seagate stomped all over the 5,400rpm drive in the XPS, with read speeds of 42MB/s versus 27.6MB/s. That's just enough to matter. However, the XPS and its GeForce Go 6800 Ultra demolished both the DIY and E1705 in all of the gaming benchmarks. There's no point in even running the numbers—putting a GeForce Go 6600 against a GeForce Go 6800 Ultra is like bringing a knife to a gunfight. Drat.

BENCH**MARKS**

	DELL E1705	DIY
SYSMARK2004 OVERALL	**209**	155
SYSMARK2004 INTERNET CONTENT CREATION	**282**	193
SYSMARK2004 OFFICE PRODUCTIVITY	**155**	125
NERO RECODE 7 (MIN:SEC)	**38:25**	56:24
DVD SHRINK (MIN:SEC)	**29:39**	57:3

Best scores are bolded.

Michael Brown

Auditions Virtual Surround Sound

Can technology sway an audio curmudgeon's opinion?

I hate imitations. When I watch DVDs, I put real butter on my popcorn, I sit in a leather recliner, and I listen to a high-powered A/V receiver pumping sound through a genuine 5.1-channel speaker system. Sure, drilling holes in my walls and crawling around my attic to wire the surround speakers with plenum-rated cable was a literal pain in the neck. But there's no such thing as a good virtual surround-sound system. Or so I thought.

I hate to admit it, but I was very pleasantly surprised by the virtual surround-sound systems I auditioned for this month's Head2Head on page 16. Yamaha's YSP-800 and Cambridge SoundWorks' SurroundWorks 200 both did an amazing job of placing audio events in a 3D space all around the room.

Both systems have their shortcomings: Neither is equipped with six discrete inputs (for front, surround, and subwoofer), so I had to use Creative's DTS-610 encoder to hook them up to a PC. Playing DVD-Audio discs wasn't a problem with the SurroundWorks 200, because its built-in disc drive is compatible with that format, but it leaves SACD fans in the lurch. The Yamaha system doesn't support either format—it falls back to DTS 5.1, so you at least get surround sound. (DRM restrictions require DVD-A and SACD players to use analog connections to an external amplifier.)

Neither of these virtual surround-sound systems is a match for a true home-theater rig, but they're an amazingly good alternative if it's impossible to wire up surround speakers in your listening environment.

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How We Test

Real-world benchmarks. Real-world results

Computer performance used to be measured with synthetic tests that had little or no bearing on real-world performance. Even worse, when hardware vendors started tailoring their drivers for these synthetic tests, the performance in actual games and applications sometimes dropped.

At *Maximum PC*, our mantra for testing has always been "real-world." We use tests that reflect tasks power users perform every single day. With that in mind, here are the six real-world benchmarks that we use to test every system we review.

SYSmark2004: This is the most comprehensive application benchmark available, using no fewer than 19 applications to measure the time it takes for the PC to complete to real-world computer-intensive tasks. Our *SYSmark* score is a composite based on the time the test takes to complete several different types of tasks.

Adobe Premiere Pro: The leading nonlinear digital-video editor has recently been retooled with more support for multi-threading. We take a raw AVI file, add several transitions and a soundtrack, export it to a generic MPEG-2 file, and then report the time the script takes to complete.

Adobe Photoshop CS: We don't subscribe to Apple's half-baked idea that running one filter test in *Photoshop*, in one certain way, at a particular time of day provides an accurate measure of performance. Instead, we take a high-resolution image and throw it through just about every filter available in *Photoshop CS* at it. Our score is the time it takes for the script to complete.

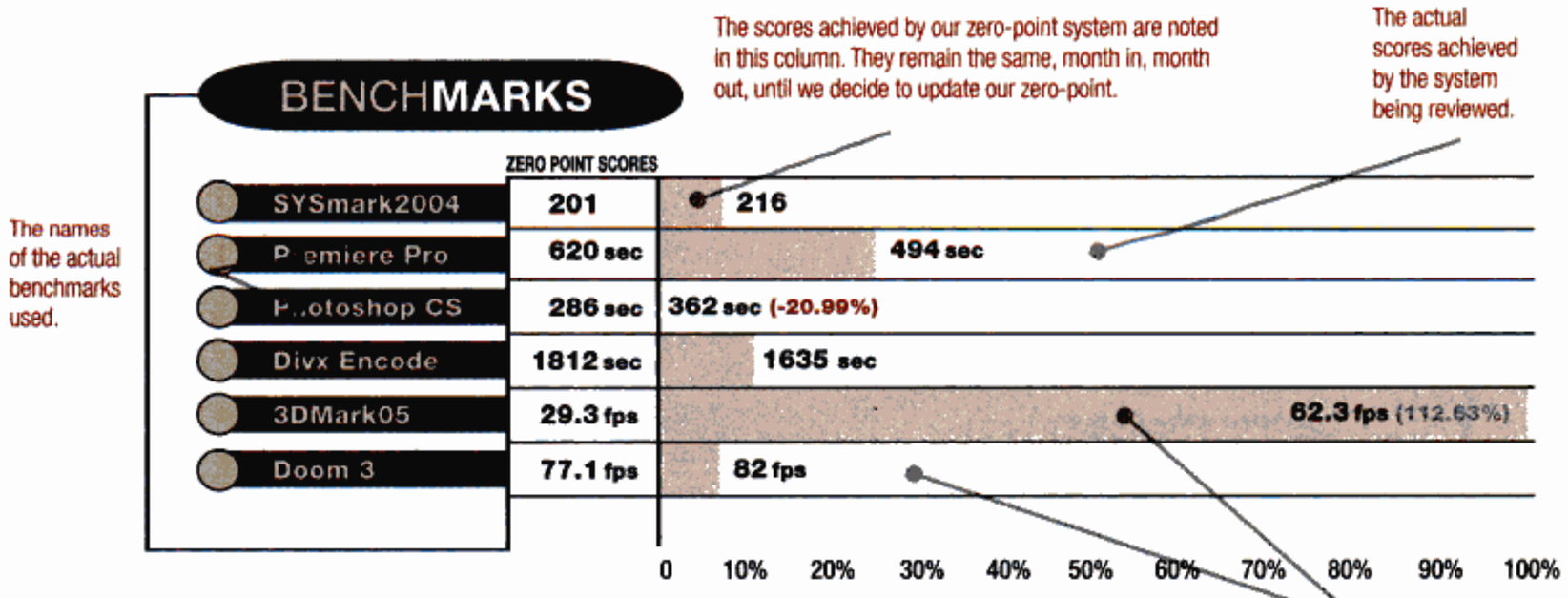
Divx Encode: Video encoding is today's time-suck. We transcode a short movie stored on the hard drive from MPEG-2 to Divx using *#1 DVD Ripper.* We report the length of time the process takes to complete.

3DMark05: After ranting about real-world tests, you might be surprised to find this "synthetic" graphics test in our suite. *3DMark05*, however, has proved to be the standard by which graphics cards and PCs that run them are judged. Instead of reporting a meaningless composite score, we run the third test at 1280x1024 with 4x antialiasing and 4x anisotropic filtering, then report the frame rate. Our zero-point system with SLI can't even break 30 frames per second.

Doom 3: Id's hugely popular game is a dark, scary, and serious test of PC horsepower. We run this game with 4x antialiasing and 4x anisotropic filtering, at 1600x1200 resolution, and report the frame rate.

How to Read Our Benchmark Chart

Maximum PC's test beds double as zero-point systems, against which all review systems are compared. Here's how to read our benchmark chart.



Our zero-point reference systems uses a 2.6GHz Athlon 64 FX-55, 2GB of DDR400 Crucial Ballistix RAM, two nVidia GeForce 6800 Ultra cards in SLI, a Maxtor 250GB DiamondMax10, a Sound Blaster Audigy 2 ZS, a PC Power and Cooling TurboCool 510 Deluxe Express, and Windows XP Pro with SP2.

Every month we remind readers of our key zero-point components.

The bar graph indicates how much faster the review system performed in respect to the zero-point system. If a system exceeds the zero-point performance by more than 100 percent, the graph will show a full-width bar and a plus sign.

Our monthly category-by-category list of our favorite products. New products are in red.

High-end videocard:
ATI Radeon X1900 XTX
It's faster than the competition and smokes it in video quality to boot

Midrange videocard:
Leadtek WinFast 7800GT TDH Extreme

Soundcard:
Creative Labs X-Fi Xtreme Music

Hard drive:
Western Digital WD400KD

External backup drive:
Western Digital Dual-Option Media Center 320GB

Portable USB drive:
Seagate Portable External Hard Drive 100GB

DVD burner:
Plextor PX-716A

Widescreen LCD monitor:
Dell 2405FPW

Desktop LCD monitor:
Samsung 940BF

Socket 939 Athlon 64 mobo:
Asus A8N32-SLI Deluxe

Socket 775 Pentium 4 mobo:
Asus P5ND32-SLI

Portable MP3 player:
Apple iPod

5.1 speakers:
M-Audio Studiophile LX4 5.1 (LX4 2.1 with 5.1 Expander System)

2.1 speakers:
M-Audio Studiophile LX4 2.1

Mid-tower case:
Lian Li PCV-1100

Full-tower case:
Silverstone TJ07

Games we are playing: City of Villains, Battlefield 2, PerplexCity, Need for Speed: Most Wanted

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Dell Inspiron E1705

Core Duo offers impressive performance

If you're limited to a notebook PC, you've no doubt been wrought with envy as your desktop buddies brag about their dual-core processors. Well, suffer no more! You aren't stuck with single-core anymore!

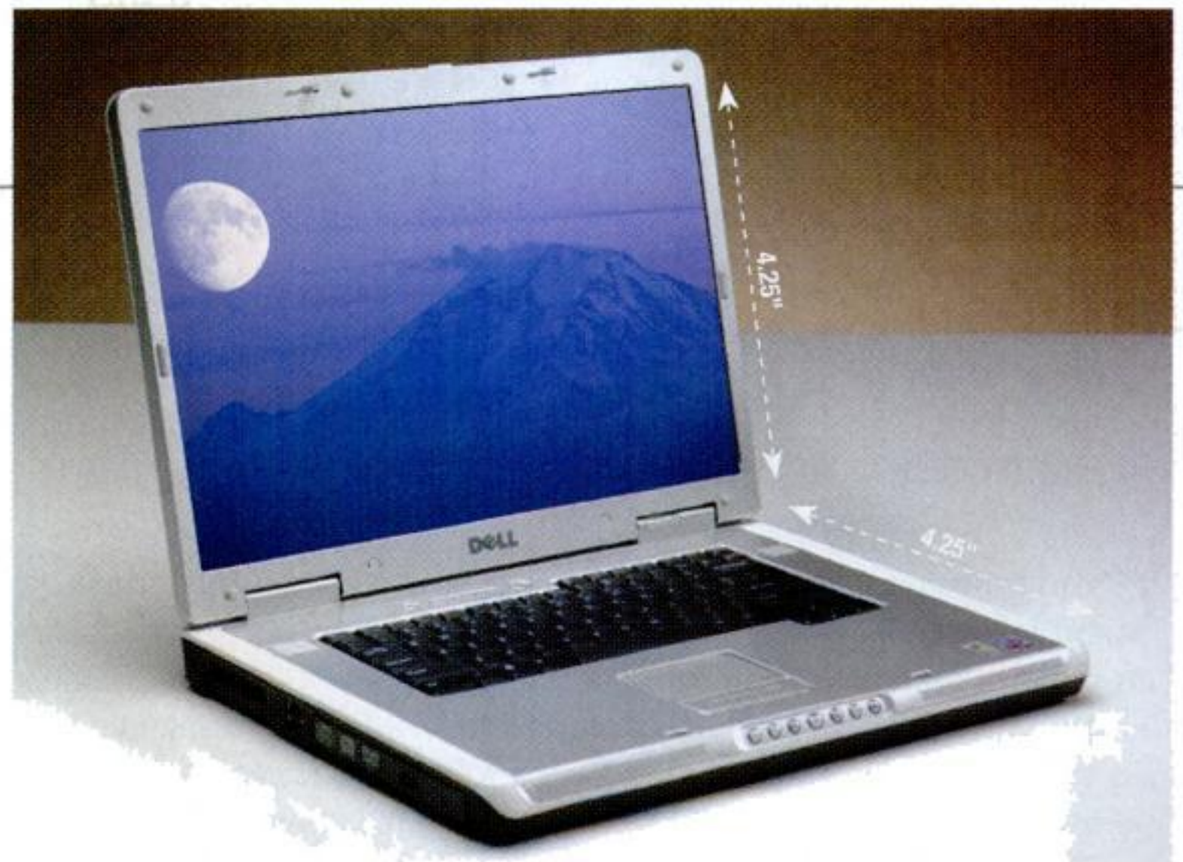
Dell's Inspiron E1705 officially unveils dual-core processing for road warriors, in the form of Intel's Core Duo T2500 CPU. Wonder what the heck a Core Duo is? We understand. Using a marketese-to-English translation converter, we discovered that the Core Duo T2500 is a Pentium M derivative CPU featuring two 2GHz cores, each with 2MB of "smart" cache. Smart cache lets a single CPU core use all of the cache—a phat 4MB—when only one core is under load, to improve performance. Core Duo is paired with the new 945 Express chipset, which supports DDR2/667 and ups the front-side bus to 667MHz.

The chassis itself is the same as the Dell XPS notebook that won our last notebook showdown (July 2005), so there aren't many surprises. It's got a gorgeous 17-inch screen with a wide notebook body to match. The chassis is solid and doesn't exhibit any undue flexing. The insides, however, are quite different from the XPS. The hard drive, which we slammed in the XPS review for being too slow, is a much faster 100GB, 7,200rpm Hitachi drive. The GPU is nVidia's GeForce Go 7800, and the optical drive is a Sony 8x DVD burner capable of supporting dual-layer +/- burns.

The real story is how well the E1705 numbers stack up. Once we were into our testing, we realized one serious shortcoming: The bulk of our mobile benchmarks aren't multithreaded. So we ran a few more dual-core-oriented benchmarks and the Core Duo is indeed a butt kicker. In *SYSmark 2004*, for example, the E1705 is faster than our FX-55 *desktop* zero-point system, with a score of 210 versus 201. It also completely spanked the 2.13GHz Pentium M we built for this month's DIY notebook feature. (For more about the benchmark comparison between the E1705 and our DIY notebook, see this month's In The Lab on page 66.)

The E1705 fared very well in our official benchmarks. In our lone multithreaded test, *Premiere Pro,* the E1705 turned in a score 37 percent faster than the XPS (and we might add, faster than our FX-55 desktop system). We even saw a good bump in *Photoshop CS,* where the E1705 turned in a 9 percent higher score than the XPS despite *Photoshop CS'* minimal multithreading use. We credit the larger "smart" cache, as well as the faster FSB and RAM in the E1705. The 7,200rpm drive is also quite a performer with average read speeds of 42MB/s.

The fun stops there. Even though our zero-point XPS has an older 12-pipe GeForce Go 6800 Ultra powering it (Dell has since switched to the 7800 GTX in its top-of-the-line XPS config), the 16-pipe 7800 in the E1705 just couldn't hang. Why? It was probably the clock speeds. The XPS cranks its GPU at 450MHz, while the E1705 sits at 250MHz. That's enough to make the E1705 between 15 and 20 percent slower in many games. Still, the E1705 can manage 40fps in *Doom 3* at 1280x1024 with 4x AA and 4x anisotropic filtering. In other words, it'll play 90 percent of the games very well at a decreased resolution, but you probably shouldn't expect to play at the panel's 1920x1200 native resolution with AA on.



The new Core Duo in the E1705 smokes all single-core mobile processors.

You get both DVI and analog outputs with Dell's E1705.

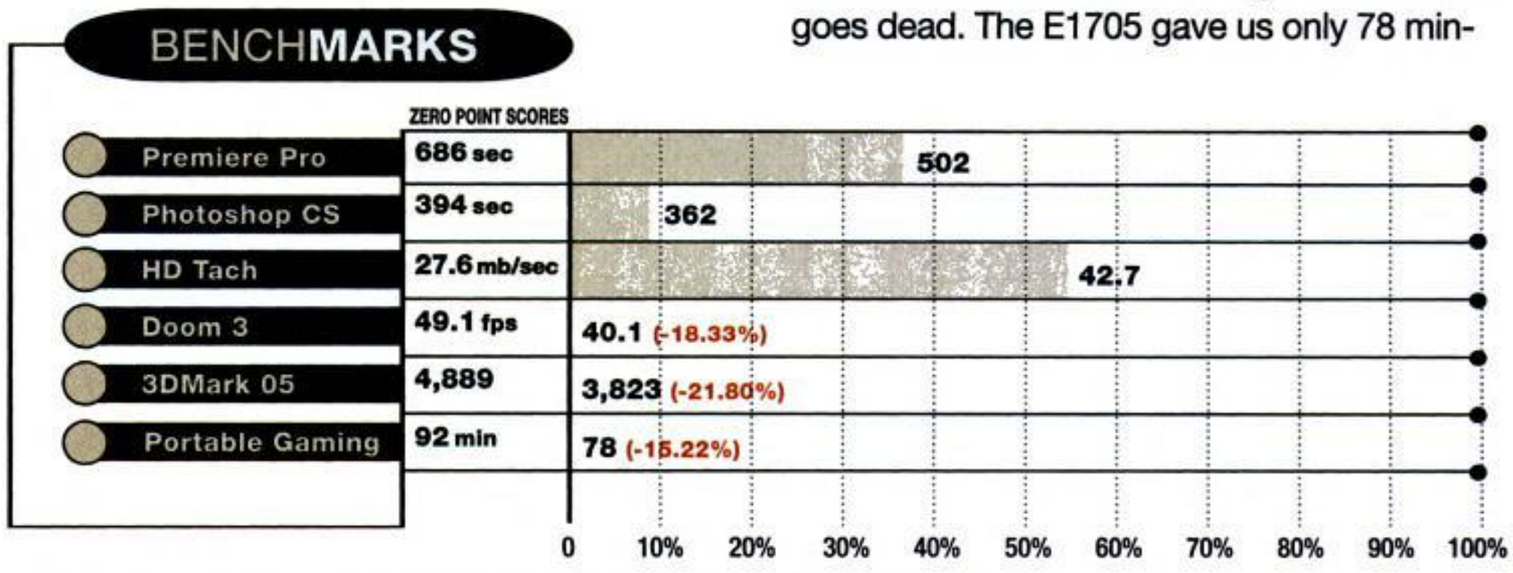
That jibes with Dell's primary pitch for the E1705 as an entertainment box. The company even includes a clunky USB TV tuner so you can watch TV, DVDs, browse and edit video, and maybe play an occasional game. For gamers who want all-out speed, we recommend waiting for an XPS equipped with a Core Duo and 7800 GTX.

The most disappointing feature of the E1705 is its battery life. To test it, we loop *3DMark03* on its default settings until the box goes dead. The E1705 gave us only 78 min-

UNDER THE HOOD

BRAINS	
CPU	Intel 2GHz Core Duo T2500 (945 chipset)
RAM	1GB DDR2/667
LAN	Intel Pro/Wireless 3945 ABG and Broadcom 440X Gigabit
HARD DRIVE	100GB Hitachi 7,200rpm TravelStar
OPTICAL	Sony DW-Q58A
BEAUTY	
VIDEO	nVidia GeForce Go 7800 256MB (250MHz core / 658MHz DDR)
DISPLAY	17-inch (1920x1200@32-bit)
AUDIO CHIP	SigmaTel HD-capable audio codec
LAP WEIGHT	8.2 lbs
CARRY WEIGHT	9.25 lbs
BOOT: 33 sec.	DOWN: 14 sec.

BENCHMARKS



Our zero point is a Dell Inspiron XPS, with a 2.13GHz Pentium M, 1GB of DDR2/533 RAM, and a GeForce Go 6800 Ultra.

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utes of play time, less than our zero-point rig. Worse, we weren't able to pin down the cause. It could be that the 16-pipe 7800 sucks more power than the higher-clocked 6800 Ultra. Or possibly the Core Duo CPU requires more juice. Heck, it could even be a dud battery cell? Even though it's a little unnerving, the Dell certainly fared better than the pathetic 51 minutes the Voodoo Envy turned in (reviewed in December 2005). Of course, that notebook has a 7800 GTX and a P4, so you know to expect asstastic battery life.

For entertainment junkies, or folks who need a notebook for content creation, the E1705 is hard to beat. But for gamers, or anyone wanting long-lasting battery life, the E1705 can be passed on.

—GORDON MAH UNG

DELL INSPIRON 1705

TWIN TURBO

Core Duo smokes Pentium M; really good speakers.

TWIN PEAKS

Poor battery life and slow gaming performance.

8

$2,800, www.dell.com

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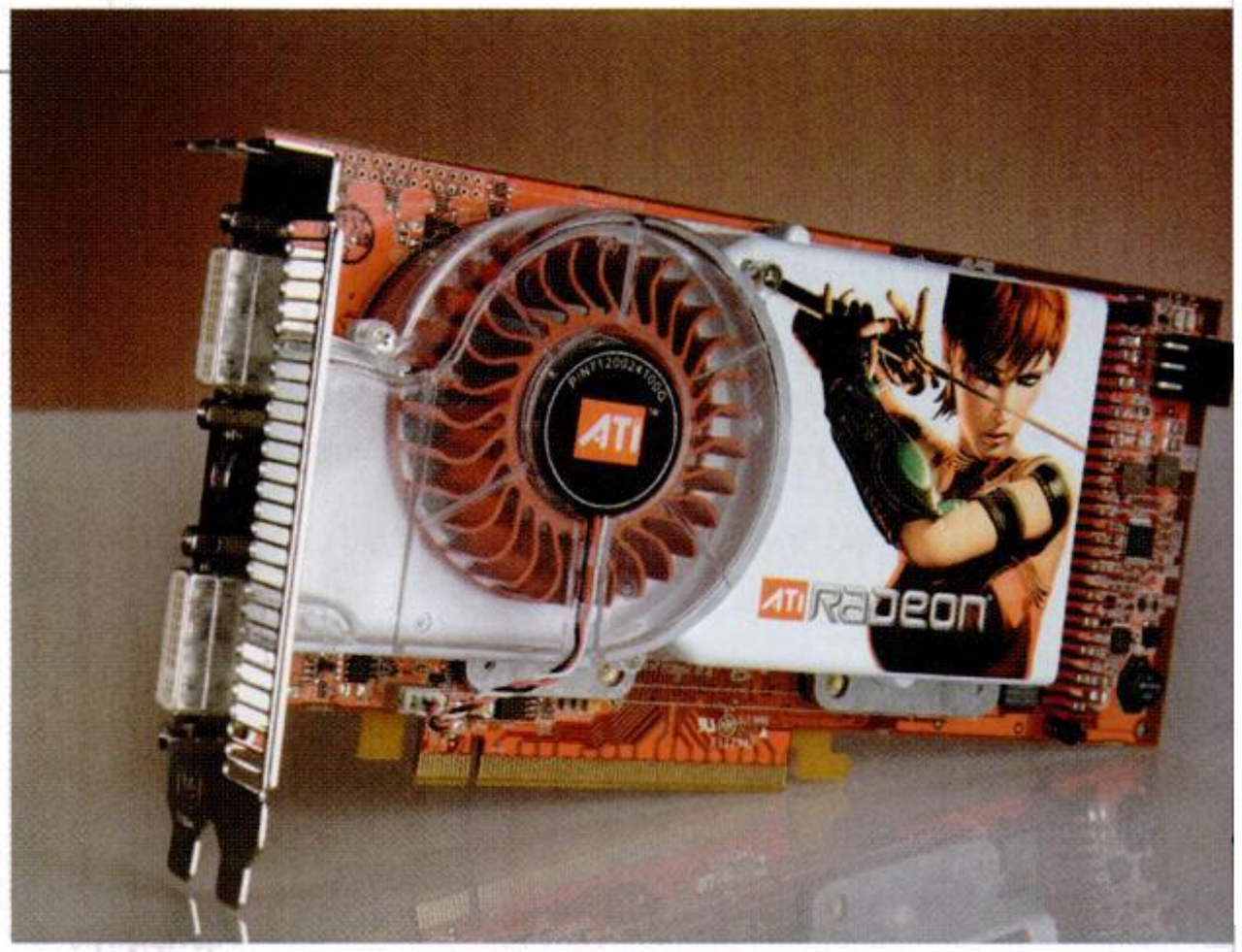
ATI Radeon X1900 XTX

Graphics goodies from the Great White North, eh?



ATI's Radeon X1900 XTX might be only slightly faster than nVidia's 512MB GeForce 7800 GTX, but ATI's card is leagues ahead of nVidia in terms of image quality.

After failing to deliver on some mighty big promises with its R520 architecture (the X1800 series), a humbled ATI went quietly back to the drawing board. And this time, it came up with a winner: The X1900 XTX—powered by the company's new R580 GPU—is a beauty *and* a beast.

In the process, ATI successfully challenged some of our assumptions about what makes a powerful videocard. Based on the spectacular performance of nVidia's 20-pipe GeForce 7800 GT and 24-pipe 7800 GTX, our eyebrows went up when we heard that the X1900 XTX would have only 16 pipes. But ATI proved us wrong. By pairing those 16 pipes with 48 pixel-shader units, the company managed to build a part that's slightly faster on most benchmarks than nVidia's 512MB 7800 GTX.

But we're less impressed by the X1900 XTX's speed than we are by its image quality. ATI had boasted that its Avivo technology would improve every aspect of the visual experience, but early drivers failed to expose its best features. We had all but dismissed Avivo as marketing hype, because nothing we saw in ATI's dog-and-pony shows materialized in the products we reviewed.

Our opinion evolved, however, with the driver release accompanying the All in Wonder X1800 XL (reviewed February 2006), and it morphed further with the X1800 XT CrossFire Edition (reviewed March 2006). The X1900 XTX's HQV benchmark score hasn't changed since then—although it still spanks nVidia's *PureVideo* decoder scores—but the difference in color saturation (which the HQV benchmark doesn't measure) is absolutely striking: Avivo is for real. Besides, Avivo improves the quality of all video, while *PureVideo* works with only MPEG-2 videos.

The X1900 XTX is slightly less exciting when measured in terms of its performance with games. As you can see from the benchmark chart, it squeaks past nVidia's reference-design 512MB 7800 GTX on some fronts, but trails it on others. And as we've seen with other X1000-series cards, a single X1900 XTX paradoxically runs just a little faster in an nForce4-chipset environment than it does with ATI's own Radeon Xpress 200 chipset (we tested the card with an Asus A8N-SLI Deluxe motherboard and a Sapphire Technology PC-A9RD480Adv, respectively). But if you want to build a CrossFire system, you'll have to buy an ATI chipset. (We've heard reports that some OEMs are building CrossFire systems using nForce4 motherboards, but these drivers aren't available to individuals.)

It's important to note, however, that the areas in which the X1900 XTX outperforms the 7800 GTX dovetail with the direction in which game developers are headed: ATI's highest-end card trails nVidia's in *3DMark03* performance by nine percent, but it bests nVidia's *3DMark05* score by nearly 13 percent. We're still evaluating the recently released *3DMark06* for inclusion in our benchmark suite, but it was enlightening to see that the X1900 XTX outperformed the 7800 GTX on this test almost entirely due to its Shader Model 3.0 and high dynamic-range lighting performance.

When you pit CrossFire against SLI, however, ATI's *3DMark05* advantage shrinks to less than two percent, and it edges out nVidia's cards by just three percent at *3DMark06*. We're not big fans of CrossFire's external connection cables, either.

So, ATI has bested nVidia for the first time in a long time: The X1900 XTX is slightly faster than a 512MB 7800 GTX, and it's widely available as we go to press. As nVidia bends down to pick up the gauntlet, however, it should be thinking of more than just horsepower: It needs an answer to Avivo, as well.

—MICHAEL BROWN

SPECS

GPU	ATI X1900 XTX
MEMORY	512MB GDDR3
CORE CLOCK SPEED	650MHz
MEMORY CLOCK SPEED	775MHz

BENCHMARKS

	X1900 XTX	7800 GTX 512MB	X1900 XTX W/X1900 XT CROSSFIRE	TWO 7800 GTX 512MB IN SLI
DOOM 3 (FPS)	71.2	**72.0**	94.7	**99.3**
3DMARK03	18,252	**19,840**	29,326	**29,777**
3DMARK05	**11,073**	9,566	**12,751**	12,521
3DMARK06	**4,995**	4,660	**6,776**	6,568
3DMARK06 SM 2.0	**2,288**	2,168	3,643	**3,653**
3DMARK06, HDR/SM 3.0	**2,541**	2,202	**4,067**	3,642
HQV SCORE	**93**	56	WNR	**56**

Best scores are bolded. Doom 3 tested at High Quality, 1600x1200, 4x AA. 3DMark03, 3DMark05, and 3DMark06 tested using default settings.

ATI RADEON X1900 XTX

+ CINEMASCOPE

Slightly faster than nVidia's best, but Avivo is the real selling point.

– KINESCOPE

CrossFire remains a hoopty dual-card solution that must be disabled for movies.

9

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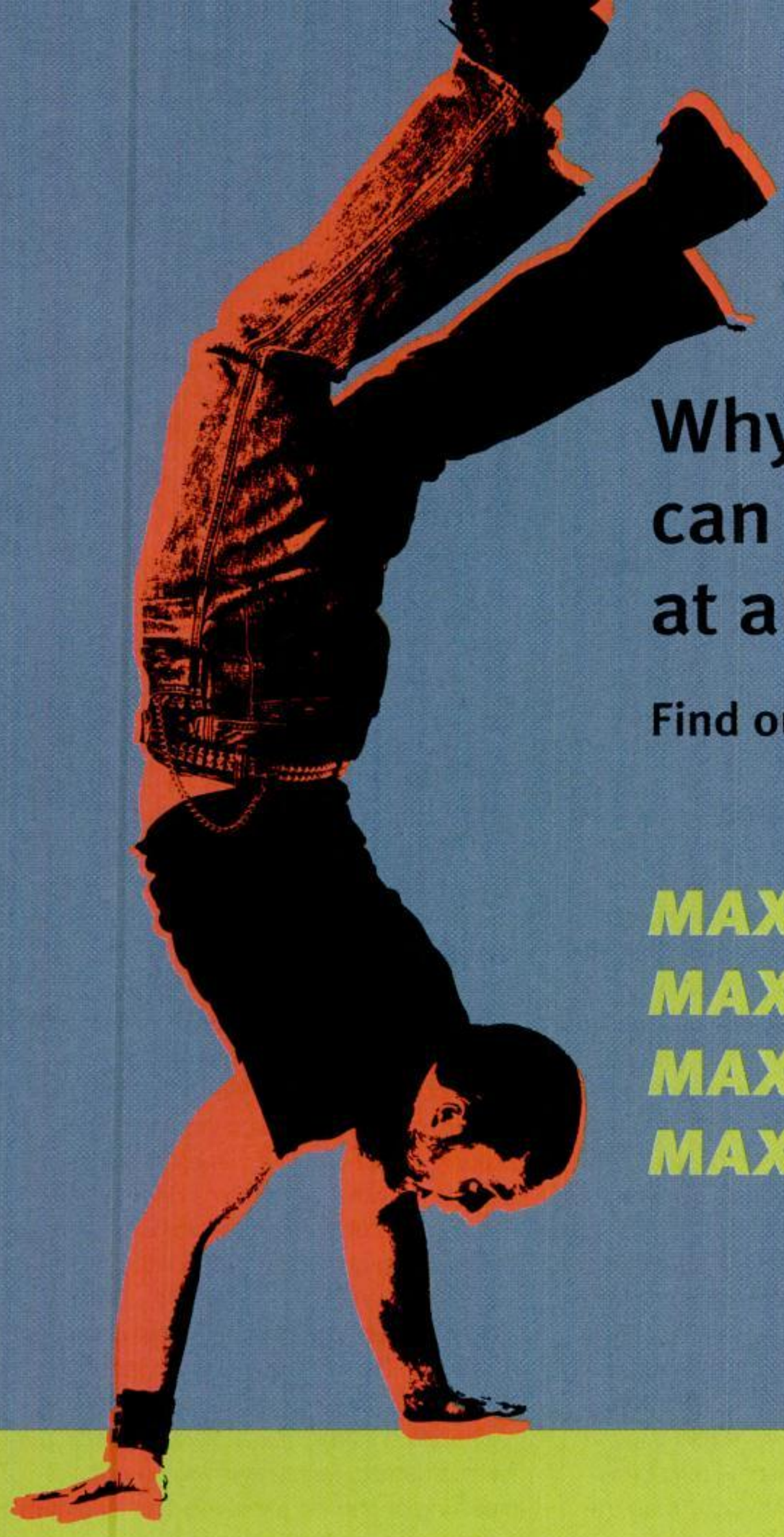

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LCD See

With the bar set at 20-inches, five fresh flat-panels strut their stuff

The year is still young, and we're already up to our eyeballs in new LCD desktop monitors. And true to form, the technology driving the bumper crop is more refined, at prices that were unimaginable a couple of years ago. Back in 2004, Dell's 20-inch 2001FP seemed like a jaw-dropping bargain at $900, today you can't find a comparable LCD for that much. As you'll see here, 20-plus inches of LCD flat-panel finery are well within the average power-user's budget; but prices still vary, so lets see how cost corresponds with quality.

—KATHERINE STEVENSON

SAMSUNG 214T

Samsung's 214T lords over the others here with a screen that measures 21.3-inches on the diagonal. It boasts a 1600x1200 native resolution, and is encased in a thin-bezeled silver or black cabinet, with an ergonomic stand that offers a telescoping neck, along with swivel, pivot, and tilt functions. Samsung also throws in a host of trademarked technologies—some built-in and some in the form of bundled software—that are intended to meet the demands of various types of content and user preferences. *MagicTune*, for example, is a software supplement to the onscreen display controls, for additional image tweaking. *MagicRotation*—another bundled app—will automatically rotate your picture when you rotate the screen. And *Natural Color* provides printer calibration screens and custom-profile creation. The 214T also offers video and S-video inputs and a picture-in-picture mode for viewing content from multiple sources. All this, of course, comes at a premium.

We were writing sonnets about Samsung's 214T, until we used it for gaming.

The price tag seems warranted when you view digital images and DVDs on the 214T's screen. With its true, deep black and stark, luminescent white, it's no wonder the screen's contrast is outstanding. Colors themselves are eye-popping and subtle detail appears distinct even in dark, shadowed areas. Indeed, we were convinced of the 214T's abilities even before it aced *DisplayMate's* (**www.displaymate.com**) battery of evaluation scripts.

We were, in fact, smitten with the big beaut, until it came to gaming, where signs of ghosting in three different titles left us cold. While the environments themselves looked stunning, movement—particularly in areas of high contrast—revealed a lag in screen-redraw times. For some folks, this is not an issue, and they'll happily reap the benefits of the 214T's gorgeous screen in all its other uses. For us, however, it's enough to make us pass.

SAMSUNG 214T

IN FOCUS
Mammoth screen, beautiful picture, and lots of extras.

OUT-FOXED
Most expensive monitor tested; flawed game performance.

8

$860, www.samsung.com

HP's LP2065 doesn't garner oohs and aahs, but it's a solid performer.

HP LP2065

At 20.1 inches diagonal, the LP2065's screen is slightly smaller than the 214T, but it boasts a similarly slim bezel and the same wide range of ergonomic adjustment options. It too comes with a software utility that provides a more user-friendly alternative to the OSD image-adjustment options, as well as *PivotPro* for easy picture rotation. The LP2065 sports only two DVI video inputs, but throws in four powered USB ports—two on the underneath and two along the left side of the cabinet.

In our various tests, the LP2065 performed respectably, but alongside the 214T it pales. Literally, in fact, when it comes to the former's black level, which just isn't as deep as the 214T's, particularly off-axis. Nor is its white as vibrant. In grayscale reproduction, the LP2065 is adept up to 128 steps, where slight kinks and ripples disrupt a smooth gradation of shades. These are minor flaws, however, and the screen looks quite nice displaying real-world content. Plus, it held its own in our various gaming tests, revealing no signs of smearing or ghosting, making it an all-around good performer for the price.

It's worth noting that the LP2065 was the only monitor we tested that suffered from "image persistence." This is a condition similar to, but less serious than, the "burn-in" that plagues CRTs. This display will show the ghost of an image on the screen long after the image has been changed. In LCDs the condition is temporary—it can usually be fixed by turning off the monitor for a period of time—and can be prevented altogether by running a dynamic or solid-white screen saver, but it's an annoyance you don't get with other screens.

HP LP2065

SEE AND BE SEEN
Nice picture; ergo stand; and powered USB ports.

SEE AND BE SNUBBED
Slight grayscale issues and image persistence

9

$650, www.hp.com

SPECS

	SAMSUNG	HP	ENVISION	BENQ	GATEWAY
SCREEN SIZE	21.3 inches	20.1 inches	20 inches	20 inches	21 inches
NATIVE RESOLUTION	1600x1200	1600x1200	1600x1200	1680x1050	1680x1050
INPUTS	VGA, DVI, video, S-video	2 DVI, 4 USB	VGA, DVI	VGA, DVI	VGA, DVI, composite, component, S-video, 2 USB

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ENVISION EN2028

It's not surprising that the EN2028 falls on the lower end of the pricing scale in this roundup, because it offers less. Its cabinet is certainly no-frills. A hinged neck allows you to lower the screen by as much as three inches, making the bottom bezel flush with your desktop, but it's not possible to swivel the screen from side to side or flip it into a portrait orientation. However, if portability is an issue, the EN2028 folds back upon its base for easy transport.

Inputs consist of a VGA and DVI port. The OSD provides control over the separate red, green, and blue color sliders, in addition to brightness and contrast controls. But the EN2028's picture had weaknesses we couldn't fix by these means. In *DisplayMate*, the monitor was able to produce very dark grays against a decent black background, as well as light grays against white. But compared with the other monitors here, the EN2028's white looked muddy, tending toward gray. And no tweaking could change

Gray is the new white, with Envision's EN2028.

that. Furthermore, the EN2028 showed slight color-tracking errors in *DM's* grayscale screens, and was unable to produce a perfectly continuous grayscale of more than 85 steps. Combined, these flaws manifest in a picture that's comparatively dull and flat.

What's more, we observed significant ghosting in our game tests. (Interestingly, all of the LCDs in this roundup are spec'd with an 8ms response time.) If you're looking to save money, there are plenty of 19-inch LCDs that cost the same, or less, and offer much better image quality: Samsung's 940BF comes to mind.

Flipped into portrait mode, Gateway's widescreen FPD2185W gives you room to view really long documents without scrolling.

GATEWAY FPD2185W

Besides having the most unwieldy moniker, Gateway's LCD bears the distinction of not including a DVI cable—it must be purchased separately—a minus in our book. It's also one of only two monitors here to boast a widescreen aspect ratio, with a native resolution of 1680x1050, and elongated proportions that nicely accommodate side-by-side windows. If you're more interested in headroom, the FPD2185W flips into portrait mode for viewing lengthy web pages or *Word* documents.

The handsome black cabinet with carbon-fiber trim offers the full complement of ergo options (and the most effortless telescoping neck we've ever experienced). The onscreen display buttons are on the bezel's outer right edge, which is a nuisance, but a bundled app makes it possible to perform many OSD functions via a software GUI. The FPD2185W has you covered for inputs, offering several video options and two built-in USB 2.0 ports. Yes, there's a lot to like about this monitor.

Sadly, the FPD2185W's performance in *DisplayMate* was just average. It couldn't produce more than 64 steps of grayscale without showing signs of compression or expansion in the various shades. While this might not be readily apparent in a lot of real-world content, it does diminish subtle detail in images and would be problematic in any work that requires careful color matching. In games, the FPD2185W's performed without incident.

So while this LCD offers a lot of bang for the buck in terms of features, it comes at the expense of top-notch image quality.

BENQ FP202W

Like Envision's entry, BenQ's FP202W is bargain-priced at $550, and it suffers some of the same issues as that monitor. The FP202W is hobbled by limited ergonomic options (offering only a forward and backward tilt) and a bare-bones feature set. Like the Gateway, the FP202W sports a widescreen aspect ratio and OSD buttons placed inconveniently along the outer right edge. BenQ offers no software alternative to the OSD, so if you want to make adjustments to the picture, you're forced to muddle through the functionality of *seven* tiny buttons whose labels you can't see. That's just cruel.

Right away, we were struck by the unevenness of FP202W's backlight. On a dark screen, light seeped through around the screen's edges, and large swaths of solid color were marred by blotchiness. In *DisplayMate*, grayscale reproduction was unimpressive and color tracking errors were evident. The monitor also has a very narrow viewing angle. Straight-on, various test content would appear acceptable, only to lose all color and contrast integrity once we stepped even slightly to the side. The FP202W was decent in terms of game response, but that hardly matters, given its myriad shortcomings. No amount of savings is worth the sacrifices you'll make with this screen.

BenQ's FP202W takes all the fun out of having a 20-inch screen.

ENVISION EN2028

LOOKING GLASS
Inexpensive.

LICKING GLASS
Lacks ergo options; poor image quality.

5

$550, www.envisiondisplay.com

GATEWAY FPD2185W

ROSE-COLORED GLASSES
Handsome, versatile cabinet; big screen; and lots of inputs.

SEEING RED
Grayscale issues affect image detail; inconvenient OSD buttons.

8

$600, www.gateway.com

BENQ FP202W

BIRD'S EYE VIEW
Inexpensive.

BIRD'S EYE STEW
Splotchy screen; poor off-axis; no ergo options.

4

$550, www.benq.us

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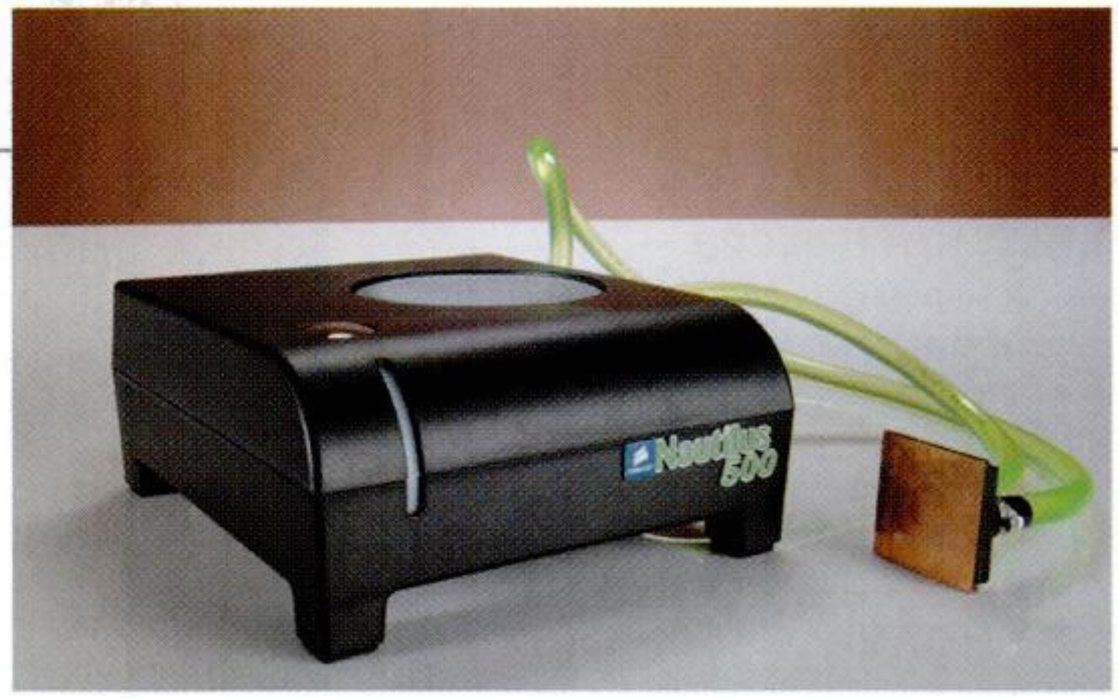
Water War

The lowdown on two high-end kits

This month we pit Corsair's all-new external kit, the Nautilus 500, against the most ambitious cooling contraption ever to darken our Lab's door—the Swiftech Apex Ultra. Both kits promise extreme cooling, so let's see if they can deliver the goods.

—JOSH NOREM



Corsair's Nautilus lets you switch between high and low fan speeds, and both settings are very quiet. Both hoses attach to the main unit via quick-plug nozzles that allow for easy detaching.

BENCHMARKS

	NAUTILUS 500	APEX ULTRA
IDLE (C)	31	**29**
100% LOAD (C)	42	**36**
OVERCLOCK (MHz)	194	**235**

Best scores are bolded. All temperatures were measured via the onboard sensors, using the Asus A.I. utility. Idle temperatures were measured after 30 minutes of inactivity and full-load temps were achieved running CPU Burn-in for one hour.

SWIFTECH APEX ULTRA

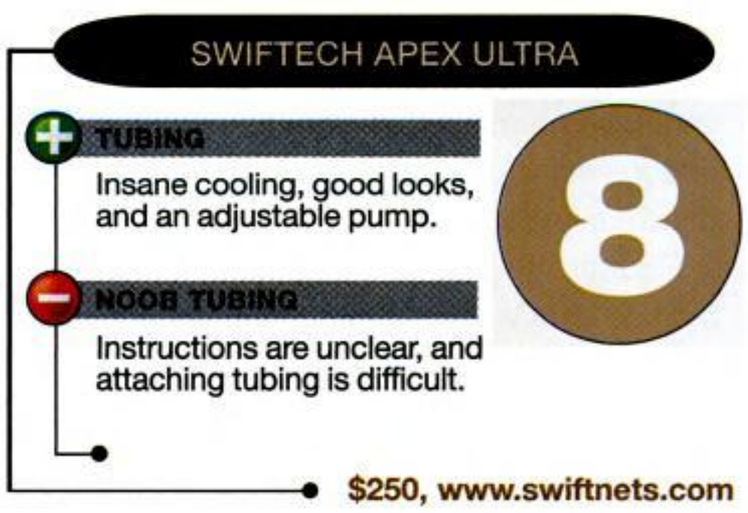
When Swiftech said it was sending us the most extreme kit it has ever built, the drooling commenced. The kit arrived, and sure enough, it's extreme—and it performs extremely well, to boot. But while it's the best-performing kit we've ever tested, it's not perfect.

The Apex Ultra uses Swiftech's Apogee universal water block, and it feeds that beast via fat, half-inch tubing and a high-flow, five-speed pump, thus bucking the low-flow trend common to most of today's kits. The kit also includes a transparent reservoir and a dual-12cm radiator that hangs off the back of your PC using Swiftech's patented Radbox design.

The numbers the Apex Ultra posted in testing are astonishing. On our Athlon FX-55 CPU, it registered an idle temp of a mere 29 C, and a load temp of just 36 C. (The stock air-cooling temps are 40 C at idle, and 54 C under load.) We were able to overclock our processor by 235MHz—the highest overclock we've ever achieved on our zero-point platform.

Impressive performance, for sure, but there are a few issues with this kit. First, installation requires you to drill two holes in your case above the I/O shield, to route the tubing from the radiator. Not everyone will want to drill holes in their case, so you can flip the Radbox upside down and route the tubing through an empty PCI slot, but no bracket is provided to do so. Second, attaching the tubes to the pump is a cast-iron bitch. We had trouble getting the tube over the barb even after we used a ton of hand soap as lubricant. There's no reason why installation of the tubing has to be this difficult. None. The installation manual is as user-unfriendly as any we've seen, which has always been Swiftech's Achilles' heel.

While its cooling performance is second-to-none, the installation seems overly difficult. It's certainly an "extreme" kit, in every sense of the word.



CORSAIR NAUTILUS 500

Corsair claims its new Nautilus kit is both affordable and easy to install, while providing exceptional cooling performance. And we're happy to report that the kit meets most of Corsair's claims.

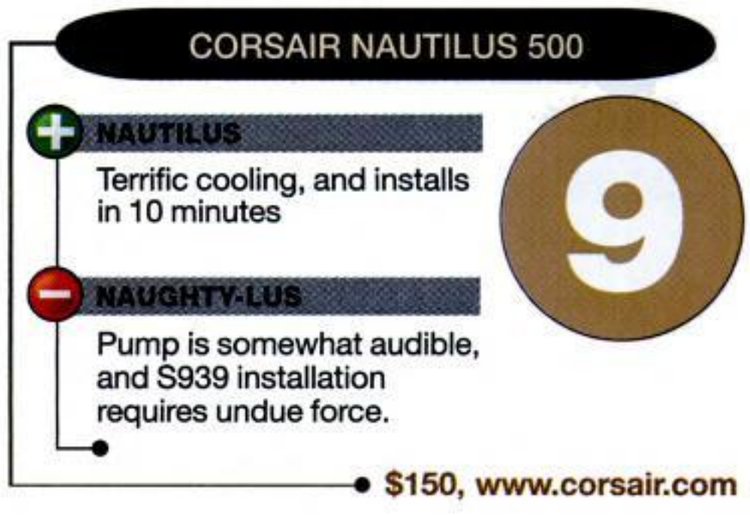
The kit is housed in a plastic enclosure that sits atop your case. It features an integrated reservoir, a 12cm radiator/fan assembly with two speeds (high and low), and a pump. It includes a CPU water block and uses UV reactive 3/8-inch tubing, along with neon-green anti-algae mix to give your coolant an alien-slime look.

The Nautilus' installation has some issues. You don't need to remove the motherboard to install the kit (it supports every late model socket), but there's a catch. Installation on a Socket 939 requires a back-breaking amount of force. We feared for our mobo's life during the process. Installing on LGA775, however, is simple: You just push down four pins to secure the water block, but you *have* to remove the motherboard to remove the block, which is annoying.

In our tests, the Nautilus 500's cooling performance was superb. We achieved a 194MHz overclock on our FX-55 processor, which is damn good. CPU temps were chilly, but not as impressive as the Apex Ultra's scores. You can also toggle fan speed from high to low, and it's reasonably quiet in either mode. In "quiet" mode its very silent, though there's a barely audible whine from the pump.

Overall, the Nautilus delivers on its promises. We don't like how much force is required for a Socket 939 install, and it's not totally silent, but it's easily the best entry-level water-cooling kit we've tested.

Swiftech's Apex Ultra uses a high-flow pump that has five adjustable flow settings, and it's whisper quiet on every one of them.



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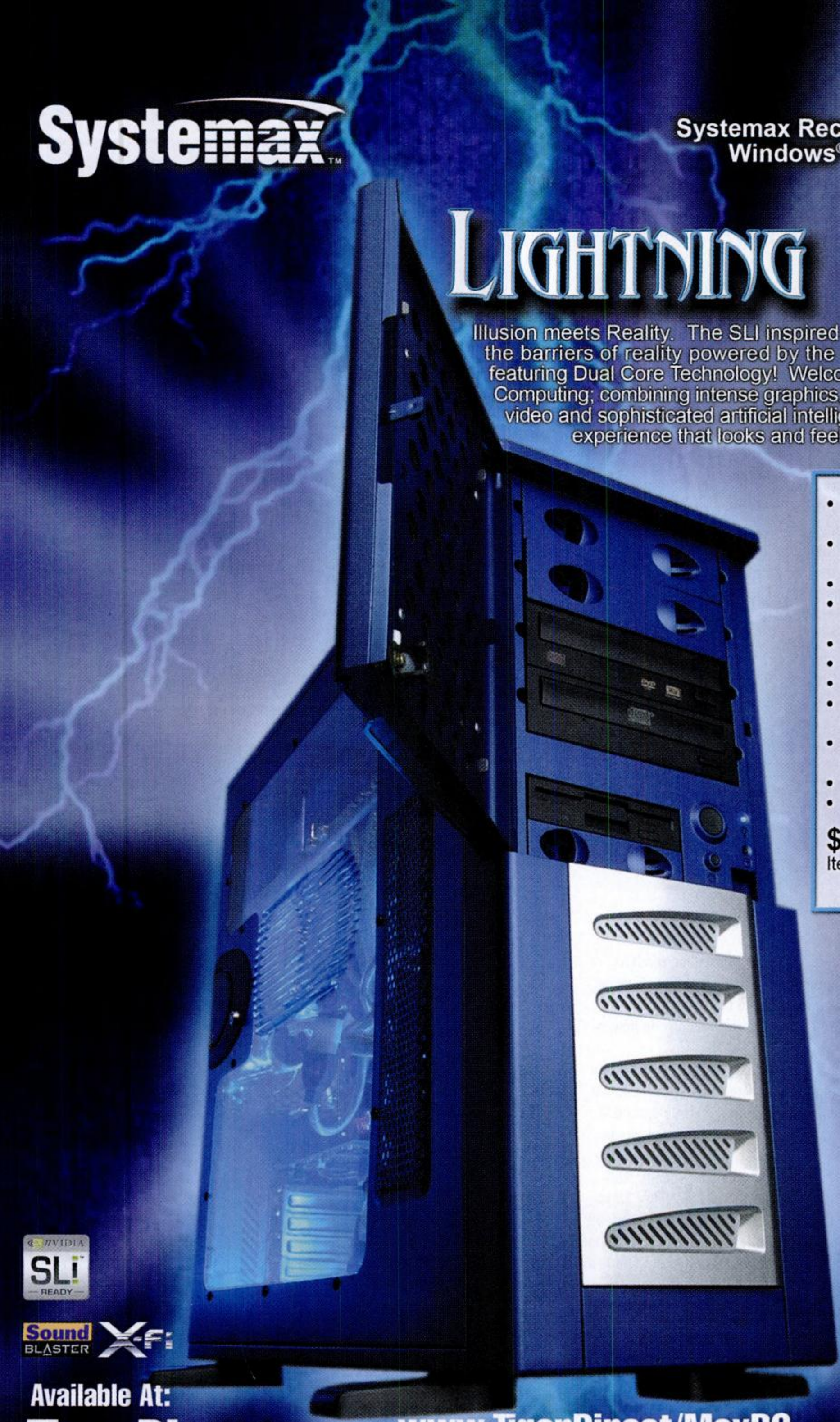

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Memorex U3 TravelDrive

Interesting tech that's of little real-world value

Whenever a USB key includes a removable cap, we end up losing it, as was the case with this TravelDrive.

Though it looks just like any other USB key, this TravelDrive from Memorex is actually quite different from other USB keys we've reviewed. Instead of serving as a mere data bucket, the TravelDrive includes "U3" technology—a front-end interface to the key that allows you to run apps, manage settings, and perform other maintenance duties, all from a Windows-like start menu. It's slick and easy to use, and the concept is a welcome one, but there are two big problems: The utilities you can put on the key are mostly useless and the key is obnoxiously slow.

Here's how the U3 experience works: You plug the key into a USB port and are presented with a Memorex splash screen. Then a little "U3" icon appears in the system tray and functions exactly like the Start button in Windows. When you click it, a menu pops up that lets you run programs installed on the key, download new utilities, explore the drive's contents, and so forth. All in all, it works just fine, but here's the rub: There's a U3 Software Central window that lists all the software that can be downloaded for the key, and most of the software either costs money, is totally worthless, or isn't available on a trial basis.

To Memorex's credit, there are a number of software trials to sample, and the downloading and installing process is effortless. But of all the software we sampled, the only apps we liked come on the key already—*Firefox*, *Thunderbird*, and *Migo* for file-syncing.

In addition to our disappointment with Software Central, the key is extremely slow at file transfers. You won't notice it with small file transfers, but it took 103 seconds to write 400MB, while Corsair's zippy Flash Voyager accomplished the same feat in a mere 46 seconds.

So even though the U3 tech is nifty and well implemented, it offers little real-world utility. Perhaps the situation will improve in the future, but for now it's more of a technology novelty.

—JOSH NOREM

MEMOREX U3 TRAVELDRIVE **6**

$100(1GB), www.memorex.com

PNY Verto GeForce 6800 GS

An incredible bang-for-the-buck videocard

PNY's $220 Verto GeForce 6800 FS is a screamin' deal for upgraders on a budget.

The words "budget" and "performance" typically fit together about as well as "Dick Cheney" and "cuddlemuffin." But thanks to nVidia's sweet GeForce 6800 GS and a little overclocking work from the engineers at PNY Technologies, budget-minded upgraders can lay their hands on one powerfully cheap videocard.

If you can spring for two of these and run 'em in SLI—either now or a little ways down the road—you'll be the proud owner of a rig that can not only hang with boxes powered by the likes of a single GeForce 7800 GTX 512MB or an ATI X1900 XTX, but one that will also outrun them on some benchmarks. Really.

Although the 6800 GS has only 12 pipes, its high clock speeds, 256-bit memory bus, and increased transistor count enable it to deliver better performance than a 16-pipe 6800 GT, which is outfitted with just a 128-bit memory-interface. nVidia accomplished this trick by taking the GeForce 6800's basic architecture and moving it from a 130nm fabrication process to a 110nm process. In fact, the benchmarks for PNY's card come within spitting distance of the 6800 Ultra—not bad for a card that's selling for just $220 at press time.

BENCHMARKS

	SINGLE PNY	TWO PNY IN SLI
DOOM 3 (FPS)	38.0	71.0
FAR CRY (FPS)	68.2	118.3
3DMARK03	12,924	21,510
3DMARK05	5,661	10,155
HQV SCORE	61	61

For details on our videocard benchmarking methodology, point your browser to www.maximumpc.com/benchmarks.

This card manages to get by with a single-slot cooler, despite its GPU being clocked at 470MHz (compared to 425MHz in nVidia's reference design) and its 256MB of memory cranked up to 550MHz (compared to the stock 500MHz). The fan is fairly quiet, but we wouldn't recommend installing it in a home-theater PC if you're sensitive about noise.

It's been some time since we've been this enthusiastic about a videocard priced under $300. In fact, our only criticism stems from PNY's decision to include just one DVI output along with a TV-out; the remaining output is a lowly VGA. Aside from that minor shortcoming, this is one of the best videocards in this price range.

—MICHAEL BROWN

PNY GEFORCE 6800 GS **9**

$220, www.pny.com

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Cooler Master Hyper L3

Cooler Master is not so masterful this time

The midrange Hyper L3 cooler eschews all-out cooling performance for silent operation and easy installation.

Typically, people swap out their heatsink/fan apparatus for one that is either quieter than the stock cooler or capable of better cooling performance. Cooler Master's Intel-only Hyper L3 doesn't grant enough improvement on either front to warrant a switch. Sure, it's quiet and its cooling performance is a tad better than the stock unit, but in general the Hyper L3 isn't much more than a better-looking version of the standard P4 cooler.

Its design is rather simple. It uses a copper base-plate that's nickel-coated to eliminate oxidation. The copper base-plate is attached to a mid-size aluminum heatsink, with three heat pipes to move the heat from the base plate into the fins of the heatsink. A 9.2cm fan sits on top. The fan uses a four-pin design and features pulse-width modulation (PWM), which varies the fan speed according to CPU temperature during operation. During testing we never crossed the PWM threshold, so the fan spun at 1100rpm at all times and was indeed very quiet.

BENCHMARKS

	HYPER L3	STOCK COOLER
IDLE (C)	36	36
100% LOAD (C)	**52**	54

Best scores are bolded. Temps were recorded using the Asus AI utility. Idle scores were determined after 30 minutes of inactivity. Full-load temps were achieved running CPU Burn-in for one hour.

As the benchmark numbers show, the Hyper L3's cooling performance is just a smidgen better than the stock cooler. We did three mountings to make sure the numbers were correct, and results were consistent throughout. On our P4 3.73GHz Extreme Edition test CPU, the Hyper L3 achieved the same idle temperature as the stock cooler, and was two degrees cooler under load. These temperatures are decent, but nothing to write home about.

Aside from its ho-hum cooling performance, there's a problem with the cooler's design. Its heat pipes force you to mount it in one particular way, making the fan cable too short to reach the four-pin PWM port on many motherboards. We just barely got the cable to fit on our Intel test board, and we were unable to make the reach on an Asus board that we tried.

The Hyper L3's cable issues combined with not-much-better-than-stock performance make this CPU cooler unworthy of high praise.

—JOSH NOREM

COOLER MASTER HYPER L3 **6**

$35, www.coolermaster.com

Neuros MPEG-4 Video Recorder 2

A cool capture device for the little screen

Neuros' MPEG-4 Video Recorder 2 enables you to copy and encode any video content to MPEG-4 SP format, so you can watch it on Sony's PSP, Apple's Video iPod, and other handheld players.

Apple and the television networks would like you to pay $2 an episode to watch TV shows on your iPod. Sony and Hollywood expect you to pay $20 each for movies you can watch on your PSP. Neuros anticipates you'll spend $150 for their MPEG-4 Video Recorder 2, so you can tell Apple, Sony, the networks, and Hollywood to pound sand.

The MPEG-4 Video Recorder 2 is an ingenious little device (we'll refer to it as the MVR2 from now on). Plug in an A/V source, press a button on the remote and it automatically encodes the signal to MPEG-4 and stores it on either CompactFlash or Memory Stick Duo media. Plug the Memory Stick into Sony's PSP and it'll play video just like Sony's UMD discs. Playing these videos on an iPod (or just about any other handheld video player) requires a quick trip through a flash memory reader-equipped PC.

The MVR2 would be much less interesting if you had to manually start and stop each recording session, so Neuros built a simple user interface into it (displayed on your TV, since the device has no screen of its own). The intuitive UI is very easy to navigate using its credit card-size remote.

SPECS

VIDEO ENCODER	MPEG-4 (with AAC-LS audio)
VIDEO RESOLUTIONS	320x240, 368x208, 640x480
VIDEO DECODERS	MPEG-4 SP, Divx 5, QuickTime 6
AUDIO DECODERS	MP3, WMA
FILE FORMATS SUPPORTED	ASF, AVI, MP4, JPEG, BMP, GIF

You can automatically stop recording after one, two, or three hours, or as soon as the incoming signal ends. The software for recording TV programs is slightly more thorough: You can establish up to six programs, each with specific start dates and start/end times; then you can instruct the device to record whatever is broadcast in these windows just once, every day, or every week. The device can't control your TV tuner, of course, so you'll need a DVR or VCR for that.

The resulting video quality is quite good, rendering this a useful gadget for folks hooked on watching video on the small screen. If you could save programs to cheaper external USB drives rather than the expensive flash formats, this would be a much more compelling product.

—MICHAEL BROWN

NEUROS VIDEO RECORDER 2 **7**

$150, www.neurosaudio.com

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Look, Ma! 100Mb/s and No Wires!

New wireless products powered by third-generation MIMO

History is repeating itself as the computer industry approaches ratification of another wireless networking protocol: Manufacturers are eagerly jumping ahead of the game and offering new products that might—or might not—be compatible with the slowly evolving 802.11n standard.

Although the IEEE and the Wi-Fi Alliance are unlikely to finish establishing 802.11n before early 2007, you can buy next-generation products today. But here's the open (and for now unanswerable) question: Will these products be compatible with actual 802.11n gear when it *does* become available?

Airgo Networks, a pioneer in the development of MIMO wireless networking chipsets was first out of the gate with its True MIMO Gen3 chipset, which promises theoretical bandwidth of 240Mb/s and actual throughput just beyond that of wired 10/100 Fast Ethernet. After taking a look at two routers and two network adapter cards based on that technology—Netgear's RangeMax 240 and Linksys' Wireless G with SRX400—we can report that both products live up to their claim of delivering wired speed without wires. At least sometimes.

Netgear uses the same Airgo chipset as Linksys, but in a prettier package. Although it's slightly slower, Netgear's combo is priced slightly higher.

LINKSYS WRT54GX AND WPC54GX4

FREE-RANGE CHICKEN
Awesome speed; incredible range.

FACTORY-FARMED BEEF
Butt-ugly formfactor; uncertain future compatibility.

8

$100, www.linksys.com

In addition to using the same Airgo chipset, both of these router/wireless access points are equipped with a four-port 10/100 Ethernet switch. As of press time, however, neither company had shipped a USB adapter or PCI card that would enable desktop PCs to take full advantage of such a souped-up wireless network.

If you decide that these speed benefits are still attractive enough to roll the dice on these products, you should be aware that they might fall back to today's 54Mb/s 802.11g standard once they're in the company of next year's genuine 802.11n gear.

—MICHAEL BROWN

LINKSYS WRT54GX4 AND WPC54GX4

The industrial-looking Linksys WRT54GX4 looks right at home in an IT department; less so in a home environment. But its 5-inch long antennae deliver excellent range when paired with the WPC54GX4 wireless network adapter: We achieved unencrypted TCP throughput of 57.4Mb/s at a range of 75 feet from the access point, on an outdoor patio surrounded by trees, with two gypsum interior walls and one plywood-siding exterior wall in between (see "Environment 1" in the benchmark chart).

Testing inside the house approximately 25 feet from the access point, with four gypsum interior walls separating the laptop from the access point, we achieved average TCP throughput of 101.2Mb/s (see "Environment 2" in the benchmark chart).

The SRX400 combo supports WPA and WPA2 encryption, and we saw negligible throughput deterioration using those standards. But we then configured it to use the older 128-bit WEP encryption, because that's the only standard recognized by both of the A/V streaming boxes we had. Imagine our surprise when we saw TCP throughput drop by more than 20 percent! Airgo tells us its performance-enhancement algorithms for WEP were disabled because the industry no longer considers it a secure encryption technique. Still, it's the only technique supported by many streaming boxes and older laptops.

Linksys uses Airgo's new True MIMO Gen3 chipset to deliver a potent wireless-networking combo that's as fast as wired Ethernet.

NETGEAR WPNT834 AND WPNT511

Netgear's WPNT834 is prettier than Linksys' entry, but this ain't no beauty contest. Equipped with comparatively stubby antennae (3.5 inches, compared with the Linksys' 5-inch aerials), this router/wireless access point equaled its competitor's impressive range, but fell just shy of its throughput.

In our patio test ("Environment 1"), the RangeMax 240 duo managed to deliver unencrypted TCP throughput of 54.6Mb/s. When we moved the tests indoors ("Environment 2"), the Netgear products couldn't quite manage to break the wired 10/100 Fast Ethernet barrier, posting TCP throughput of 99.7Mb/s. Still, that's a mighty impressive number for a wireless network. Unfortunately, the RangeMax products exhibited the same drop in throughput using WEP encryption—a compromise rendered necessary by our A/V-streaming box.

Besides being a hair slower than Linksys' twosome, Netgear has priced its products $50 and $30 higher, respectively. Huh?

NETGEAR WPNT834 AND WPNT511

FREE-RANGE CHICKEN
Very fast; impressive range.

BATTERY HENS
Higher price tag for slightly less performance.

7

$130, www.netgear.com

BENCHMARKS

	LINKSYS	NETGEAR
TCP THROUGHPUT IN ENVIRONMENT 1 (MB/S)	**57.4**	54.6
TCP THROUGHPUT IN ENVIRONMENT 2 (MB/S)	**101.2**	99.7

Best scores are bolded. TCP throughput measured using Ixia's QCheck network benchmark utility running on PC connected to router and Qcheck endpoint running on a laptop with the vendor's wireless network adapter installed.

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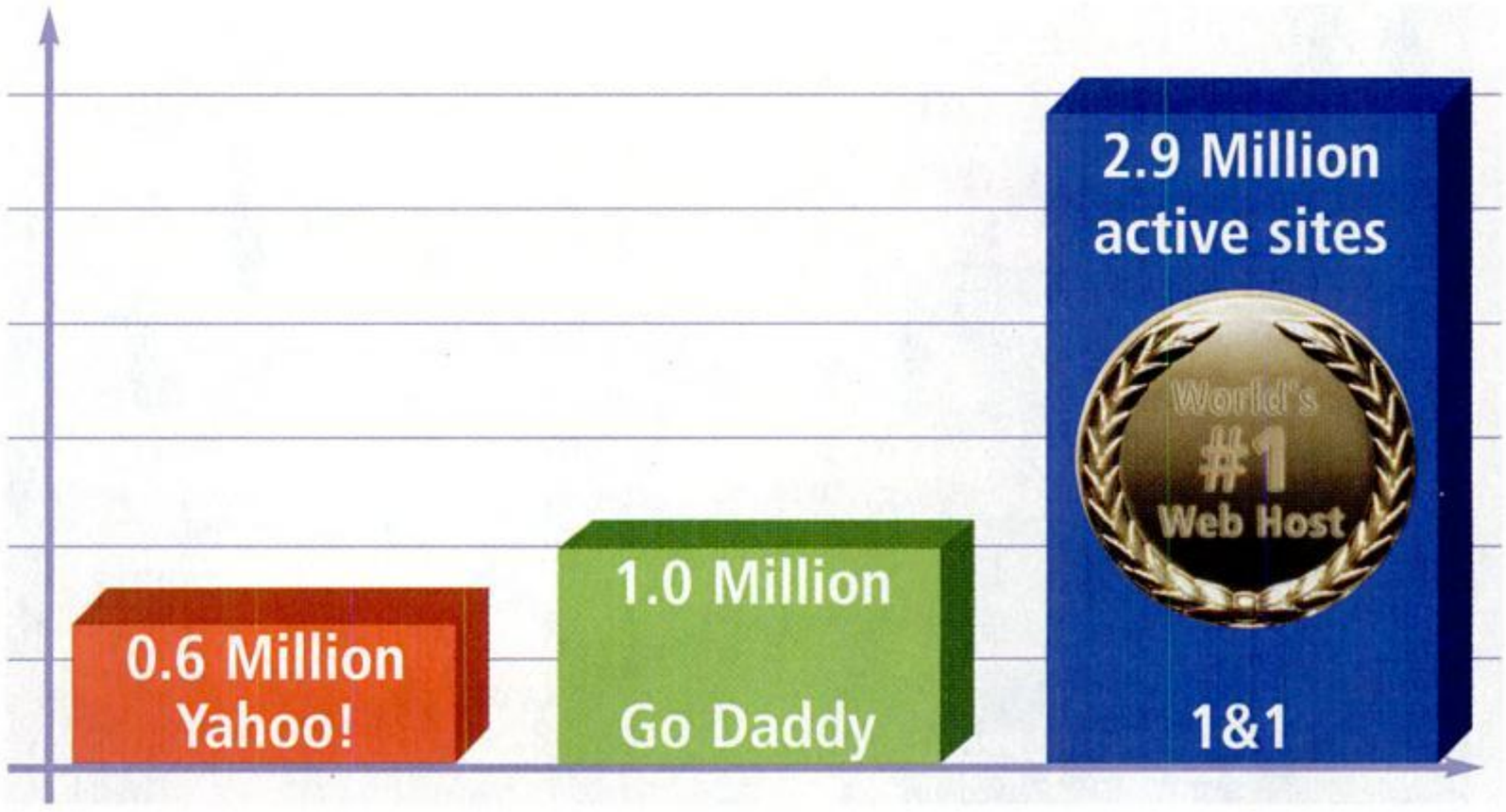

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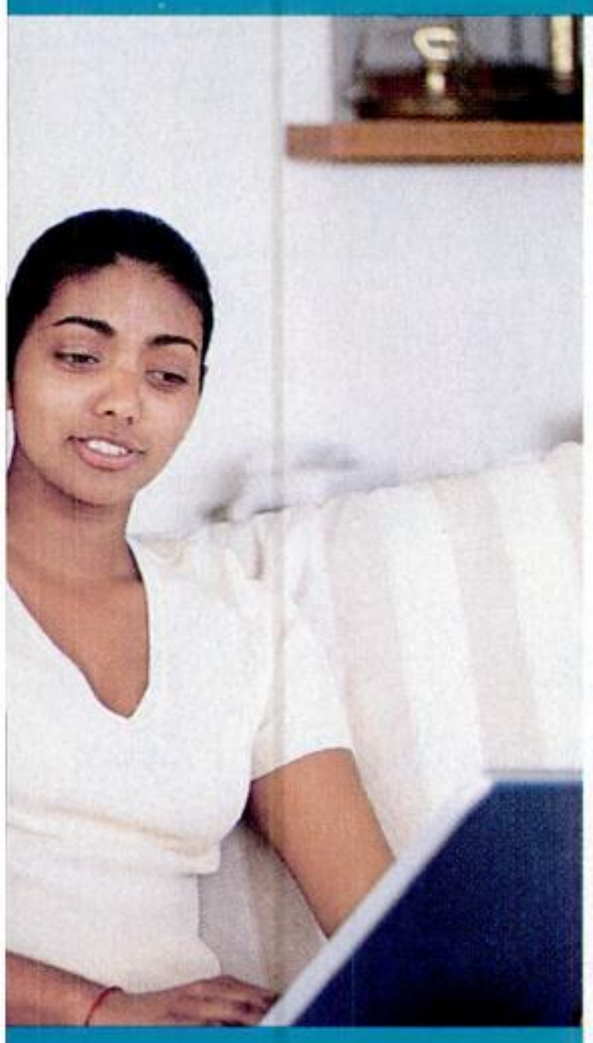

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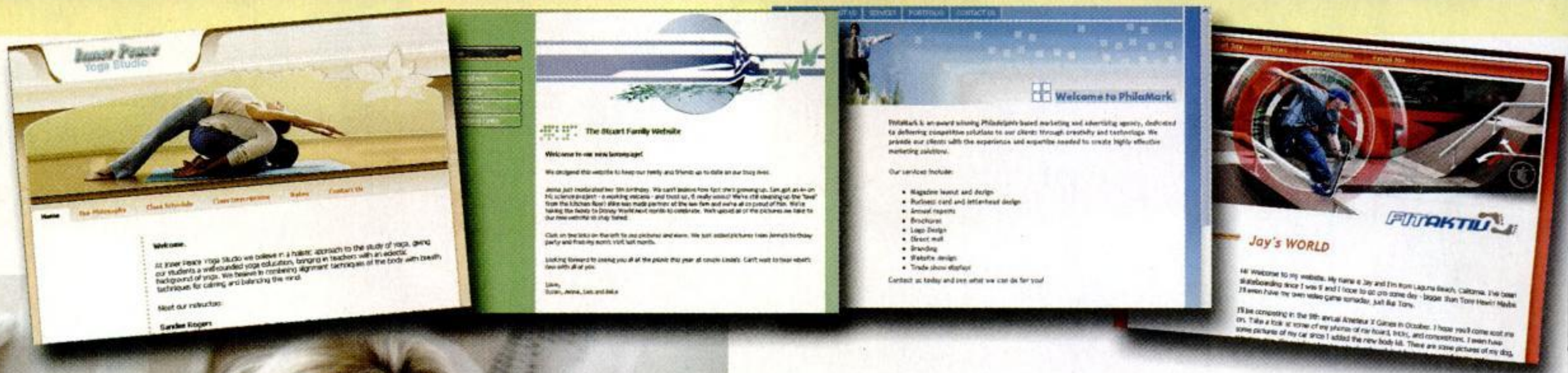

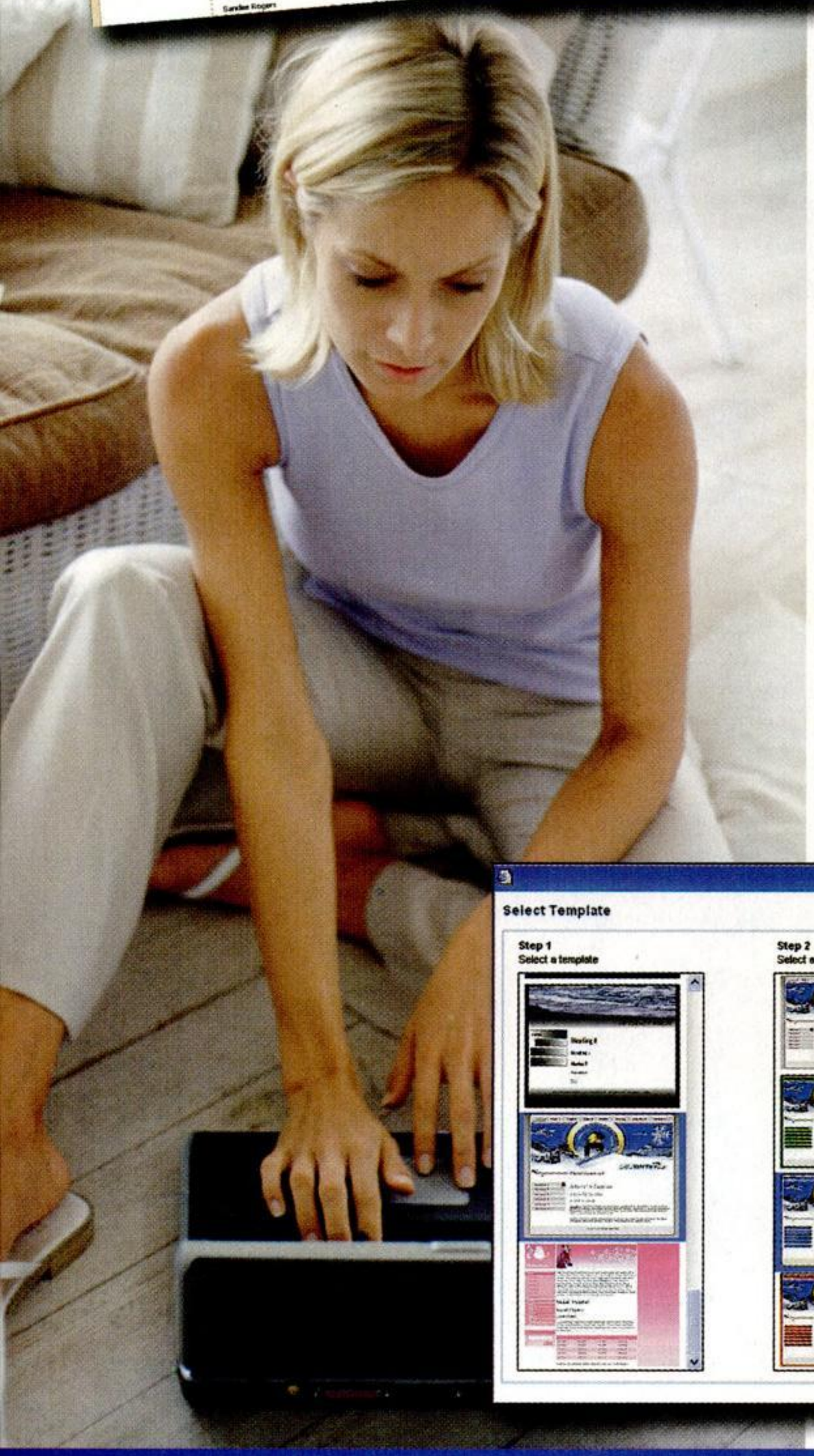

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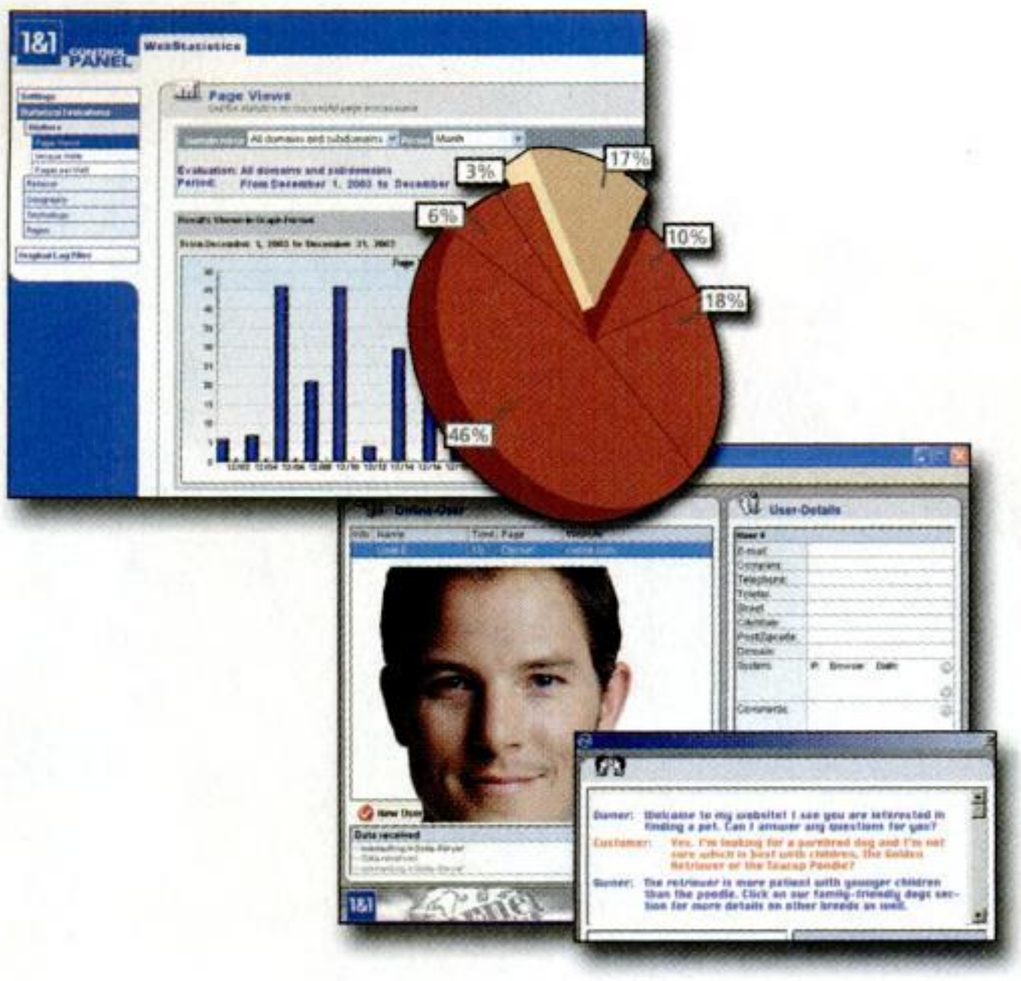

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Perl Support (Linux)	✓	✓	✓
Software suite ($600 value)	✓	–	–
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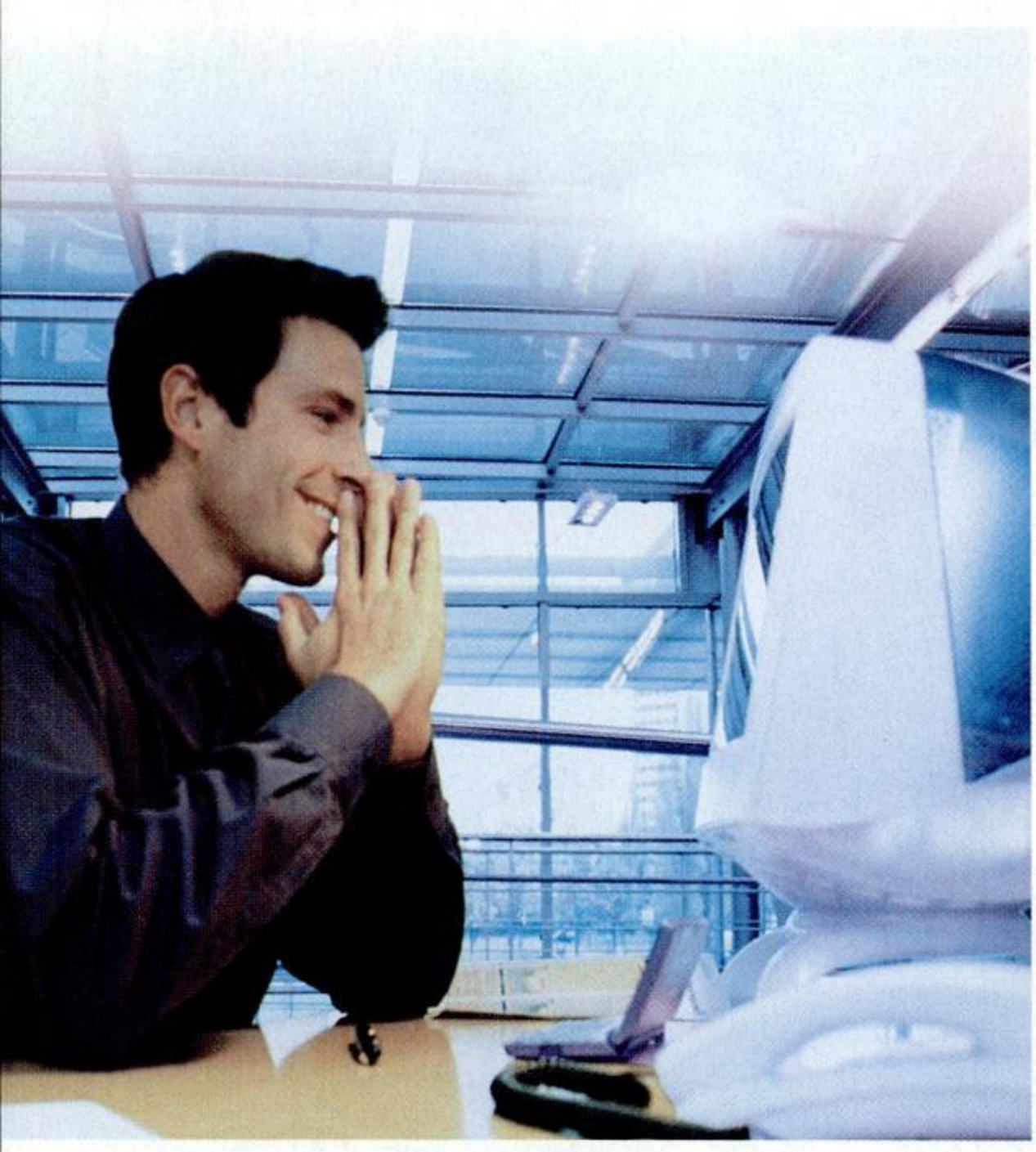

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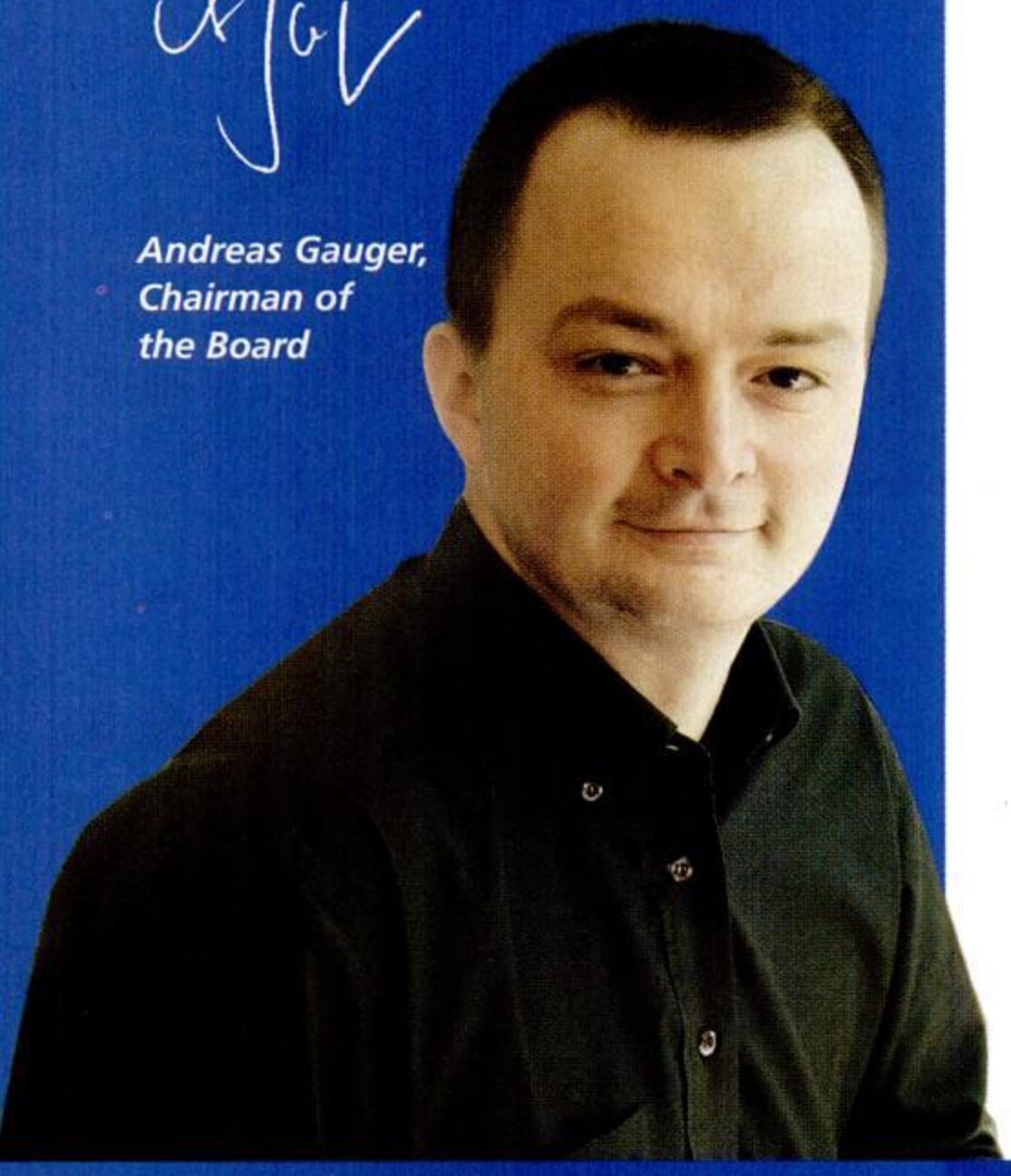

Andreas Gauger, Chairman of the Board

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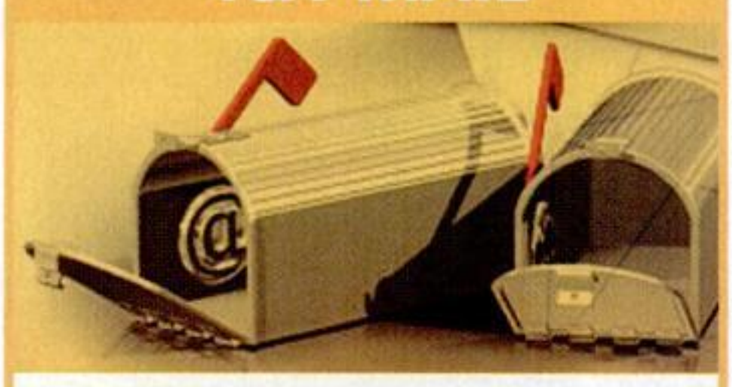

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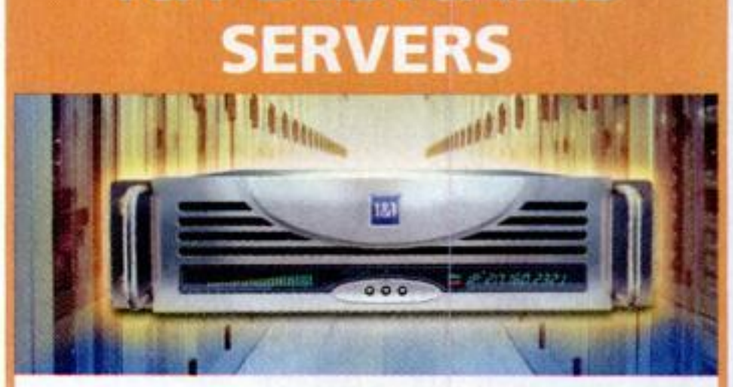

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ATX Argument

Two gaming cases go bezel-to-bezel

We haven't seen a beige case 'round these parts in a coon's age—after all, outrageously styled cases are currently all the rage. Take these two enclosures, for example: They are, as Steve Martin might say, two wild and crazy cases!

—CLAUDE McIVER

MGE DRAGON

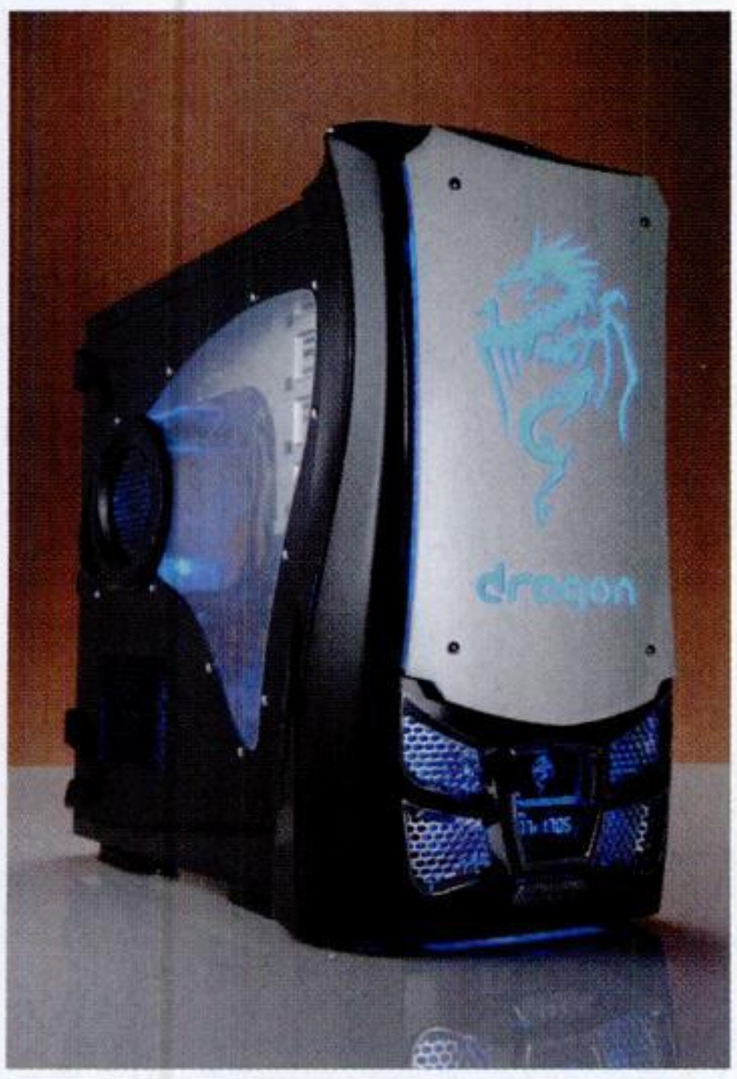
The dragon is certainly one of the most, um, "creative" case designs we've seen lately. Yet despite its overt cheesiness, it's a better-than-average PC enclosure with a lot going for it—just not enough to justify its steep price tag.

Let's start with the front: A huge dragon is emblazoned on the brushed-aluminum front bezel, and it's lit by several blue LEDs. Below is a display that shows fan activity, temperatures, a clock, and system uptime. That's all good, but the display would be much more useful if it was positioned near the top of the case, where you could actually read it. A sturdy, built-in handle on top of the case terminates at a pop-up panel that hides USB, audio, and FireWire ports.

Building a system in the Dragon is effortless, thanks to its removable motherboard tray and tool-less assembly. Drives are secured using über-nifty latches that pop on or off in a New York minute. The sliding clips that hold down PCI cards, however, aren't secure enough for our tastes.

Two blue LED 8cm fans—one front intake and one rear exhaust—provide an average amount of cooling. We prefer bigger, quieter fans, however, so it's lucky the included ATX 2.0 500W PSU, which the manufacturer claims is SLI-ready, boasts a 12cm belly fan.

With its crazy lighting and lightweight construction, the Dragon is ideal for LAN-lovers. We just don't know how many gamers will be won over by the Dragon's price, which seems rather steep for a case made from thin aluminum and plastic. For this kind of money, you can get a super-sturdy case with more panache.



You'll either love or loathe the Dragon's styling, but there's no disagreement that its innards are well-designed.

MGE DRAGON

POWER PLAYER

500W PSU included; tool-less; strong handle.

POWER OUTAGE

Sub-par cooling; poorly placed display; pricey.

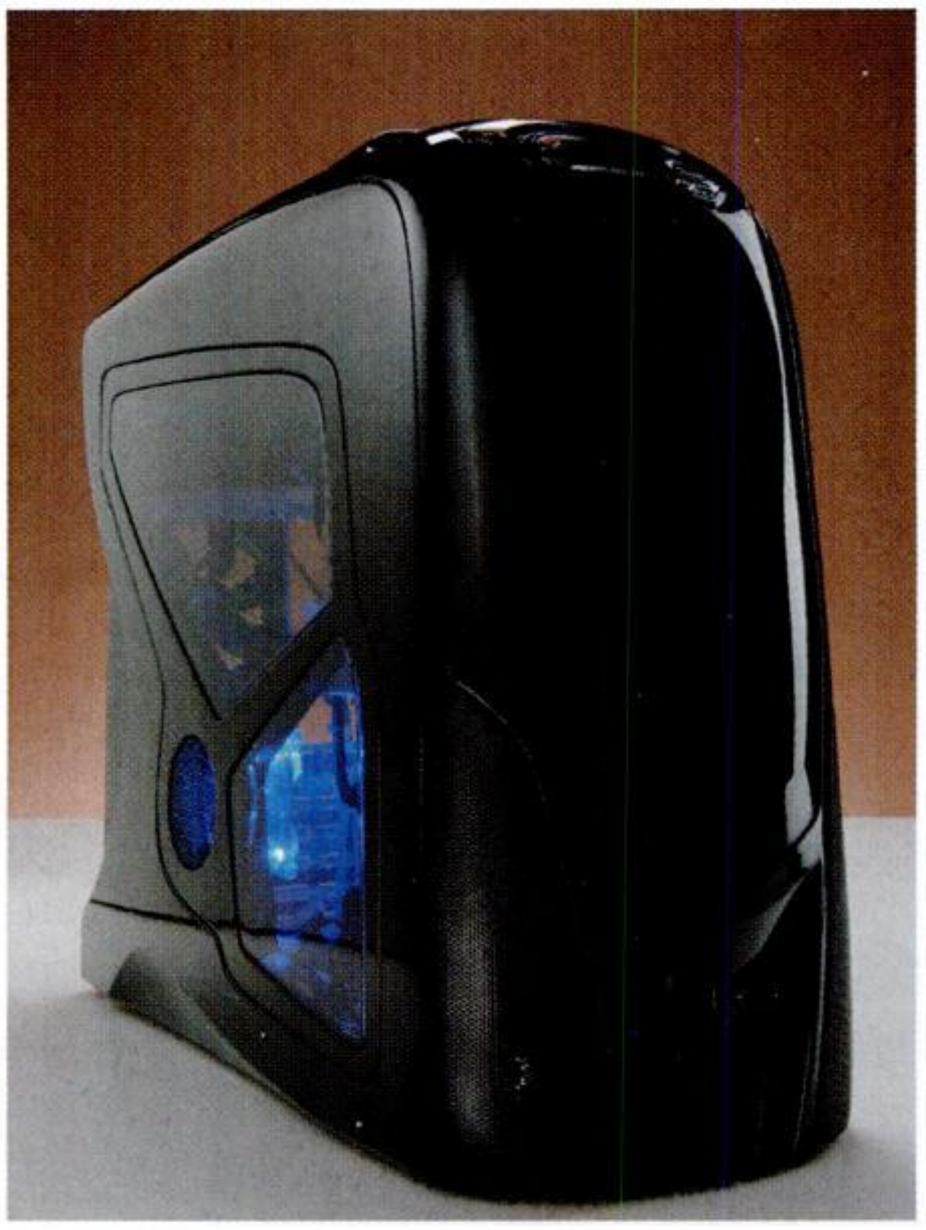
7

$200, www.xgbox.com

RAIDMAX RX-9

With its racecar-inspired design, the Raidmax RX-9 looks snazzy, and makes for an overall impressive enclosure, despite the presence of a couple questionable features.

The front bezel is made from "tinted" plastic. A gentle push on the bezel door allows it to open, revealing five 5.25-inch bays. Above the bays is a fanbus with an LCD display that's rather miniscule. This provides temperature readouts and lets you control up to three case fans. The display also contains the power button and the sensor for the included remote control. Whazzatt? Yes, an included remote about the size of the iPod Nano lets you turn the system on or off and control fan speeds remotely. Of course, we wonder why you really need a remote for this? The whole concept is ridiculous.



Subtlety is not the strong point of the RX-9

The interior is fully tool-less, which makes for a hassle-free building process. Preinstalled clips secure up to three 3.5-inch drives, as well as all of the 5.25-inch bay devices. The clips are easy to use and provide a secure hold. There are even idiot-proof clips for PCI expansion cards. Cooling is more than sufficient, with a 12cm intake fan, a 12cm rear exhaust, and an 8cm side intake fan that's lit with blue LEDs.

Overall, the RX-9 has what it takes, where it counts. The plastic shell is a bit flimsy, but it covers the basics and looks good doing so.

RAIDMAX RX-9

CASES

Solid cooling; easy install; racy looks.

BRACES

Useless extras and lots of plastic.

8

$120, www.raidmax.com

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Creative I-Trigue L3800 Speakers

Pretty. Pretty vacant

Ogling—and then listening to—Creative's I-Trigue L3800 speakers brings the above-referenced Sex Pistols' lyric to mind. The mod, sexy satellites look stunning bracketing a svelte flat-panel monitor. But lust dissolves into indifference the moment they make a sound.

The satellites' brushed-aluminum cabinets house a pair of tiny NeoTitanium drivers—a rare metal found only in Creative Labs' speakers and the occasional science-fiction novel—and look as if they could be displayed at the Guggenheim. (Snarkiness aside, the trademark springs from the fact that the drivers are fabricated from titanium, and they're driven by neodymium magnets.) These high-frequency drivers are supplemented by side-firing midrange drivers, which lend the 2.1-channel system an impressively wide soundstage.

The satellites are bi-amplified, meaning that the 1.3-inch tweeters and 2-inch midrange drivers are powered by separate amps (delivering 9 watts RMS in total). This design choice typically results in superior fidelity, and the L3800 sats deliver satisfyingly meaty tones from their mids; but the tweeters rendered Neil Young's harmonica work on "Prairie Wind" harsh enough to grate Parmesan.

SPECS

SATELLITE SPEAKERS	Twin 1.3-inch titanium tweeters, single 2-inch paper cone midrange; magnetically shielded enclosures
SATELLITE POWER	9 watts per channel, RMS (bi-amplified)
SUBWOOFER	6.5-inch paper cone driver
SUBWOOFER POWER	30 watts, RMS
SIGNAL-TO-NOISE RATIO	80dB

Creative's I-Trigue L3800 speakers offer plenty of sizzle, but deliver very little steak.

The satellite amps were noisy, too; a steady background hiss emanated from the tweeters in the absence of an input signal. The 6.5-inch, side-firing, ported subwoofer and its dedicated 30-watt amp, on the other hand, delivered well-defined and agreeably punchy bass.

The I-Trigue line is designed for use with handheld media players and console game systems, as well as PCs. This is the first model in that lineup to come with an infrared remote that controls not just the speakers (power, satellite and sub levels, and mute), but several models of Creative's Zen players, too. Plug one of these into the 3800's wireless desktop receiver—which also has a convenient headphone jack—and you can use the remote to play, pause, and skip tracks on the Zen.

The I-Trigue L3800 provides a feast for the eyes, but its noisy amps and unforgiving tweeters left our ears feeling famished.

—MICHAEL BROWN

CREATIVE I-TRIGUE L3800 **5**

$150, www.creative.com

Picture Code Noise Ninja

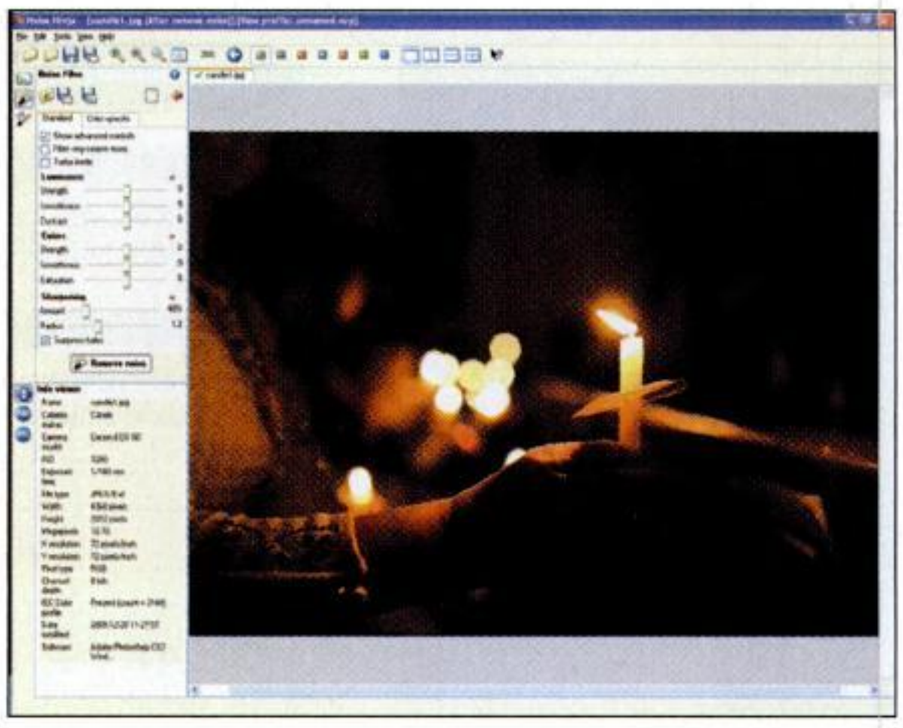
Slice and dice those grainy digital pics

As camera makers have shoved more and more pixels onto tiny imaging sensors, digital pictures have become increasingly noisy and so filled with grain that the old craptacular Disc Camera seems superior at times.

Enter PictureCode's *Noise Ninja*, an application that takes a +3 katana to the digital noise that can ruin an otherwise good picture. *Ninja* comes in a dizzying array of flavors but we looked at the stand-alone professional version (a plug-in for *Photoshop* is also available). The pro version supports 16-bit images, batch processing, and multi-threading.

We tasked *Ninja* with cleaning up a couple of grainy images from our own collection, one of which was a candlelit JPEG image taken with a Canon 5D at 3200 ISO. (While the 5D's full-frame sensor is more than capable of producing clean, sharp pictures, a candlelit shot at 3200 ISO is a challenge for any digital camera.) To compare the *Ninja's* performance, we also ran our images through Adobe *Photoshop CS2*'s built-in noise-reduction filter. There was no contest. *CS2's* "free" functionality doesn't hold a candle to *Ninja's* noise reduction, or speed. Furthermore, *Ninja* is aided by prebuilt profiles that are available for a host of digital cameras models.

What really impressed us was the program's efficiency. Tweaking an image often requires a lot of back and forth, as you "clean" areas, then revert back to the original, turn a few knobs, and clean again. With other products, it can get pretty tedious because of the slow pace at which the changes are processed. We had no complaints about speed with *Ninja*. Even on a single-core 3.8GHz Prescott Pentium 4, the performance was snappy. What's more, *Ninja* is multithreaded, so users with dual-core PCs and PCs with Hyper-Threading should see an even greater boost in speed. We applaud developers who support today's hardware instead of pandering to the unwashed masses of ancient Pentium IIIs.



By harnessing the power of today's hardware, *Ninja* makes quick work of cleaning up pics.

Ninja isn't just about the hardware support though; its snappy performance, ease of use, and batch processing make it a must-have for anyone who is serious about his or her digital pictures.

—GORDON MAH UNG

PICTURE CODE NOISE NINJA **9**

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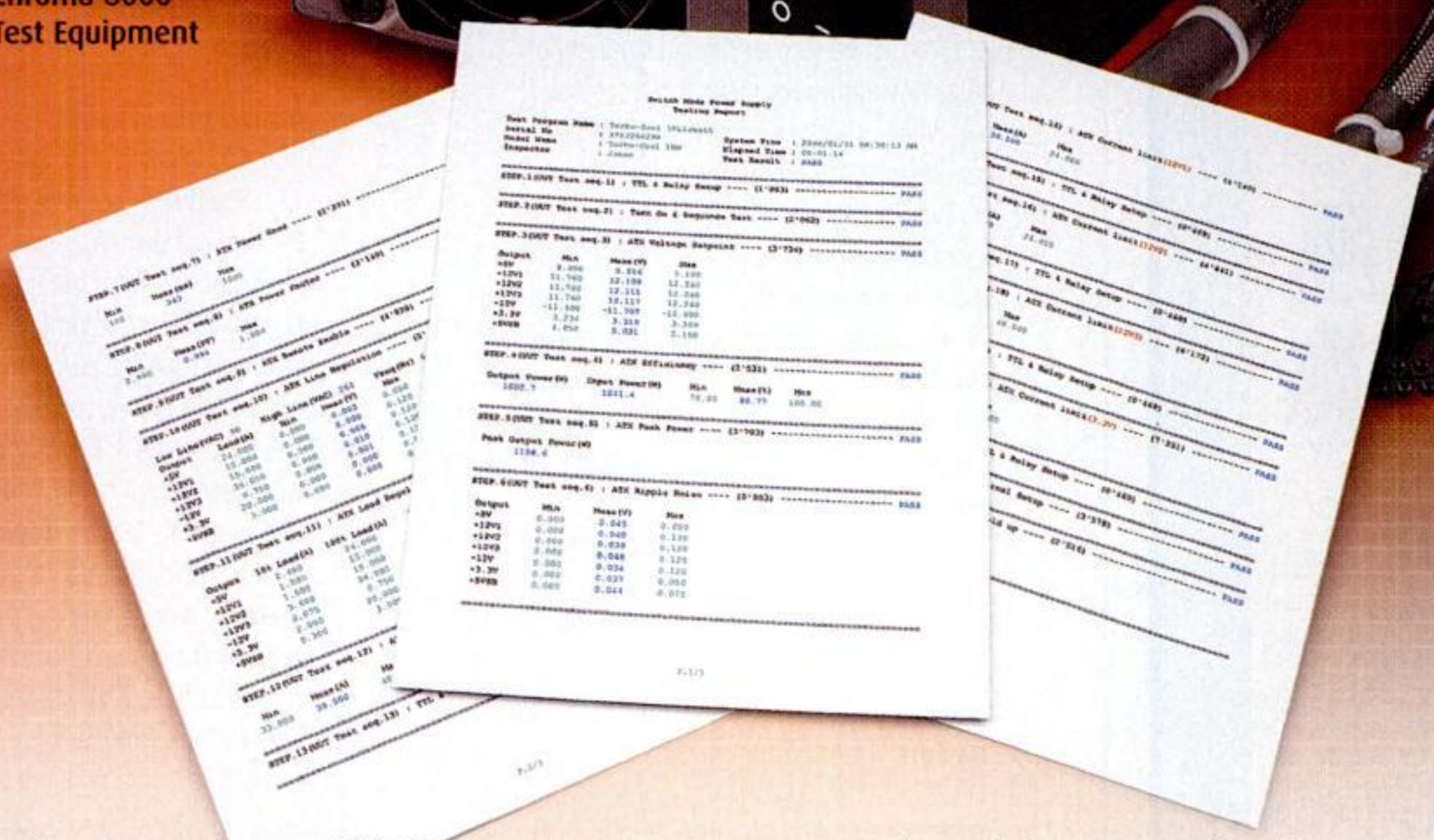

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BLUETOOTH HEADSET

nXZEN Plus

Talking on a cellphone while you're driving or sitting in a restaurant doesn't exactly display mastery of the social graces, but needs sometimes trump manners. If you must yak in public, do the rest of us a favor and use good equipment.

If your phone supports Bluetooth, Gennum's nXZEN Plus is a fabulous wireless headset. It's tiny and lightweight, and it sounds great. Gennum's secret weapon is a powerful DSP chip paired with two highly directional microphones; together, they do an excellent job of canceling background noise.

We tested the headset in a variety of noisy environments, including a crowded bar, while driving in a convertible at freeway speeds with the top down, and even standing between two loudspeakers at very high volume. We never felt the need to speak above a conversational level to compensate for the racket. Listening on a cellphone at the other end of the connection, road noise was perceived as a soft whoosh, bar chatter was reduced to a dull murmur, and we could barely hear the speakers.

Four buttons control all the headset's functions. We found the large side-button (on/off and call answer) simple to locate and use, but the volume control and "pinch" (mute/unmute) buttons proved a little more cumbersome.

In addition to sounding great, the nXZEN comes with thoughtful features: plug a second, cabled earpiece into the headset and your MP3 player and you can listen to music in stereo. The headset will automatically mute your tunes when you receive an incoming call. Laptop users who like to travel light will appreciate the ability to charge the headset using either an AC adapter or a USB cable.

—MICHAEL BROWN

NXZEN PLUS **8**

$160, www.nxzen.com

MINI DV CAM

Oregon Scientific ATC-1000 DV Cam

We described Samsung's SC-X105L Sports Cam as being "perfect for capturing your best *Jackass* moments" when we reviewed it in January 2006. Oregon Scientific's ATC-1000 could be that little camera's even littler brother.

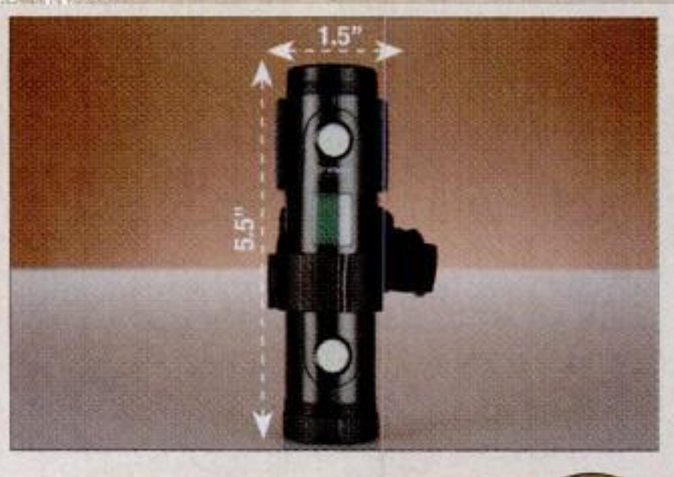
Sure, this DV cam maxes out at 640x480 resolution, it delivers a glacially slow capture rate of just 15 frames per second, and it's outfitted with a miniscule 32MB of flash memory (upgradeable to a full gigabyte by way of its hidden SD memory card slot), but do you really need anything more to capture stupid human tricks?

The barrel-shaped device runs on four AAA batteries and is about the size of a rifle scope. You can fasten it to damn near anything—handlebars, pith helmet, model rocket—using the provided nylon strap and shock-absorbing rubber mount. The videos and still images we captured in our tests using the CMOS image sensor and fixed-focus lens were pretty grainy, but the camera proved to be quite capable of taking a beating without falling apart.

You download images and video from the camera using a mini USB 1.1 port, which draws power from the host PC while it's connected—a convenient battery-saving feature, since the camera doesn't come with a separate power supply.

OK, so the ATC-1000 doesn't have nearly as many features as the Samsung, and its image quality leaves much to be desired. But with a $120 price tag, it's so cheap that you probably won't mind if it's damaged while capturing a gnarly misadventure on your snowboard or dirt bike; that is, if you and the camera's memory survive the escapade sufficiently intact to watch it later.

—MICHAEL BROWN



ATC-1000 DV CAM **7**

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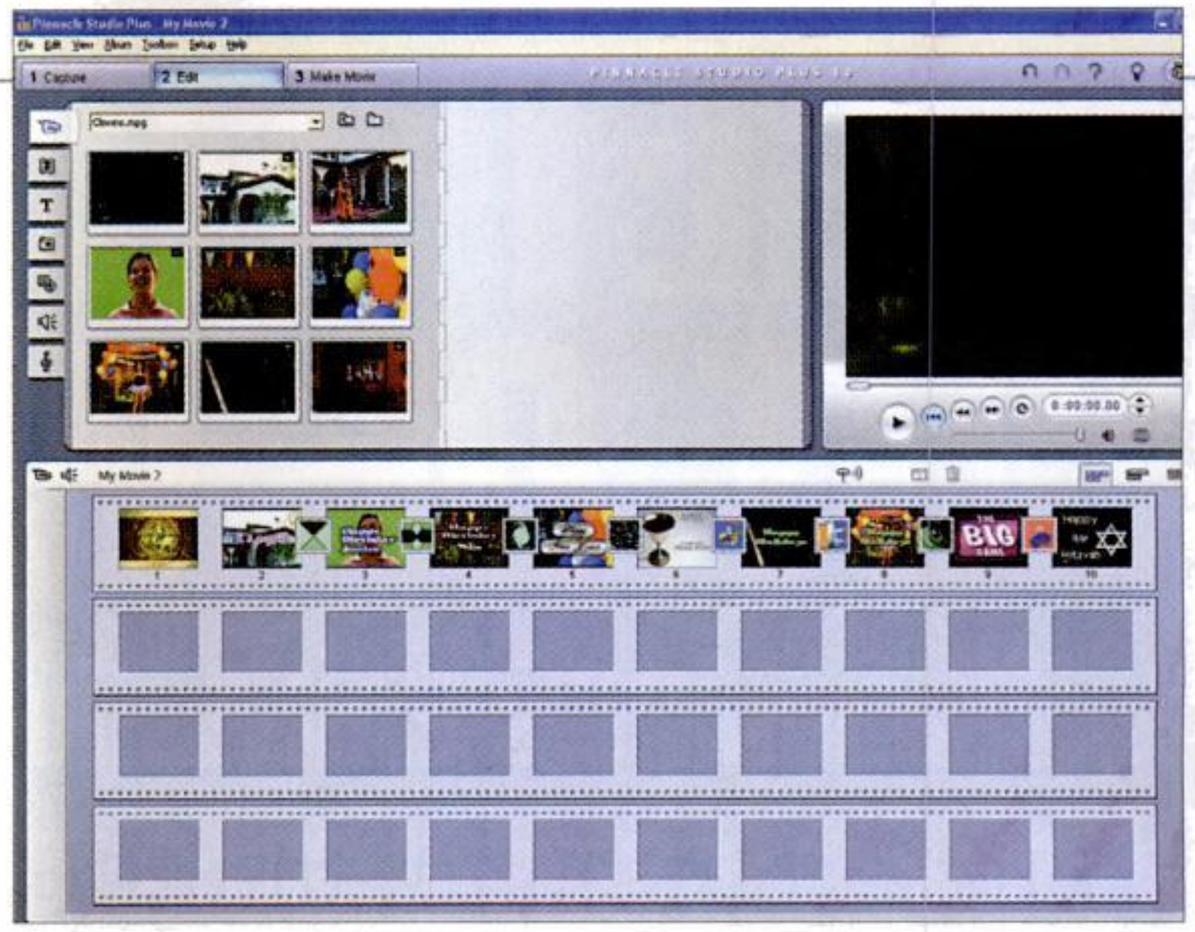
Pinnacle Systems Studio Plus 10

Now with 10 percent more bugs and crashes, apparently



***Studio 10's* storyboard review makes it a snap to add transitions in your home video.**

When it was released, *Pinnacle Systems Studio 9* gained a reputation as a roach motel: Bugs went in and they didn't come out. The bad word spread so fast and so furiously that the company wadded up the product, tossed it in a dumpster and started over again.

The result is *Studio Plus 10*. In a nutshell, the program features *Studio 9's* familiar and super-friendly interface bolted to an engine based on Pinnacle's professional *Liquid Edition* editor.

Unfortunately, somewhere along the way, things didn't gel. Despite putting reliability and bugs at the top of the priority list, Pinnacle's new *Studio* is less than optimal. OK, it was a buggy, horrible mess on not one, but two different machines. That's really unfortunate, because *Studio* sports some truly compelling features that make it a far friendlier video editor than its direct competitor: Adobe's *Premiere Elements 2.0*, which we reviewed in March.

Our first problem surfaced during the install on a dual-Opteron machine. The app took an inordinate amount of time to install, giving us an error message during the process, yet somehow the install completed anyway. We successfully captured 10 minutes of video from a DV cam, but after a few minutes of editing, the program crashed to the desktop. Mind you, that's *with* the latest update for the program installed. Indeed, the program crashed on us enough times that we gave up and moved to a second machine. Our second PC was an Athlon 64 FX-60 with 2GB of RAM, an nForce4 X16 chipset, and SLI. The program successfully installed the first two discs, but the third gave us an error. Nice. We finally gave up on the third bonus disc completely.

Pinnacle said the installation problem is a "known issue" that will soon be fixed with a new patch. The company also said it's working on a patch to specifically address "issues" with AMD machines.

If you can successfully install *Studio*, you'll find that it's quite welcoming to users of all stripes. If *Premiere Elements 2.0* is like an old college buddy, *Studio* is the little poodle that humps your leg when you come to visit—it's in your face and friendly from the start.

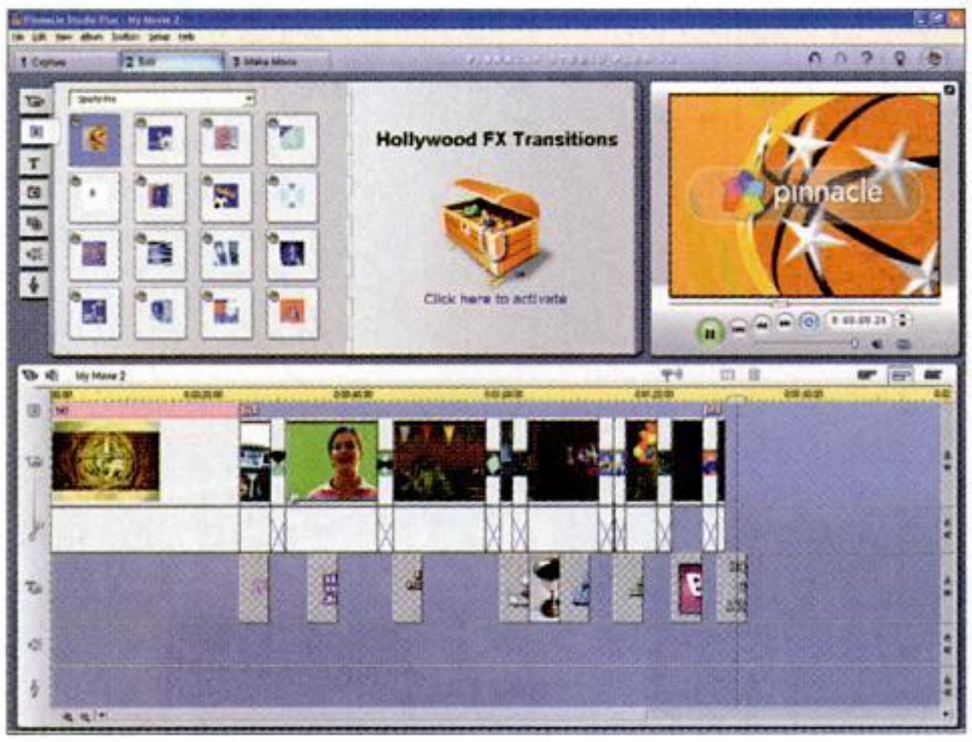
Newbies will feel right at home with the storyboard mode, which lets you perform a quick edit rather than tangling with the traditional timeline, although the program does support a timeline, if you prefer. And for users who don't want to actually edit their own videos, the SmartMovie mode will automatically turn your footage into a music video. It works in a pinch, but hardly counts as an actual project. It's analogous to a "write my sentence for me" button in *Word*, or an auto-crop mode for your images. Not everything about *Studio* is intuitive, however. We found DVD creation to be more straightforward with *Elements 2.0*.

We appreciate *Studio's* comparatively large assortment of transitions, but we find the program's pay-as-you-go scheme to be quite annoying. The program dangles page upon page of transitions in your face that you can't use unless you pay for them. Fortunately, you can disable the "premium" content ads, but it's a drag to be reminded that you need to pay more money for a product you already purchased. The program also includes more robust audio tools than *Premiere Elements 2.0*.

Studio boasts the ability to edit high-definition video, but we were unable to capture any video with our pro-level cam—a Sony HVR-Z1. It was probably an issue of how we configured the camera; after all, it's pretty unlikely someone will use an $80 program to edit video from a $5,000 camera.

Pinnacle says the latest version of *Studio* might be labeled 10, but it's really a totally new product. We believe it—this definitely feels like a 1.0 app! While we think Pinnacle is laying the foundation for a potentially great new editing application, it's pretty freaking far from that right now. That coupled with its Athlon stability issues make it impossible for us to recommend this program.

—GORDON MAH UNG



Nothing makes us madder than to pay for a program, which then tells us we need to pay more for more functionality.

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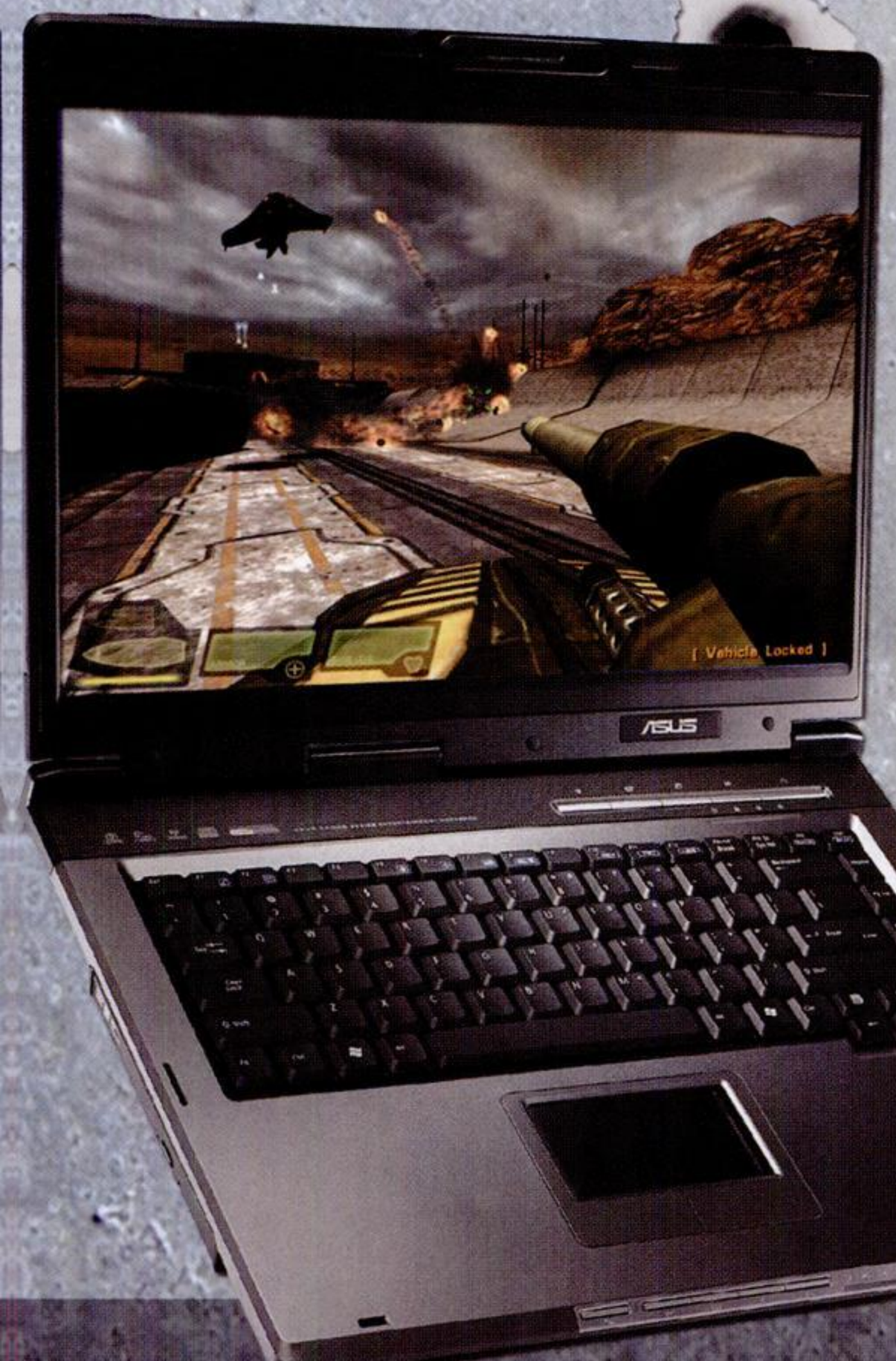

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Peter Jackson's King Kong

Are you ready for hot man-and-beast action?

It's a little-known fact that aside from being king of the jungle, King Kong was also a practicing dinosaur orthodontist.

In *King Kong* the game, you play as both Jack Driscoll *and* King Kong, reliving scenes from the movie—as well as other events that weren't in the film. Although the action is frantic, the overall experience is a stilted patchwork of sequences, lacking the movie's compelling storyline.

You'll play the first half of the game as Jack Driscoll, in a fairly typical first-person shooter. The gameplay is equal parts stealth and fast-paced action: You'll find yourself battling giant bugs, dinosaurs, and snarling bat creatures. Bullets alone won't defeat these beasts (you don't get much ammo, anyway), so you'll have to be creative and use the environment and everything around you. In one particularly creative sequence, we used fish as bait to lure raptors into a bushy marsh, and then set the entire marsh aflame, sending the nasty raptors to their Cretaceous maker. In this part of the game, the action seldom lets up and is absolutely adrenaline-pumping.

The other half of the game is spent playing as the big boy—King Kong himself—and it's a completely different experience. Aside from the scale difference, you're perched high atop the food chain, easily smiting enemies that were a challenge during the FPS portion of the game. Dueling with several T. rex's makes for some ferocious fighting, even if the camera isn't always ideally placed. Controlling the combat with a keyboard and mouse isn't too difficult, but the button-mashing aspects of the game get frustrating quickly. Kong's last few levels in New York are also too brief, and the final battle atop the Empire State Building is a letdown.

Unless you've seen the movie, the game doesn't do a good job of conveying the narrative. The game's biggest pitfall is its inability to capture the emotional connection between Kong and Ann that really comes through in the film. The jungle's beauty and awe-inspiring spectacle are all present and accounted for, but the story lacks heart.

—NORMAN CHAN

KING KONG **8**

$40, www.kingkonggame.com, ESRB: T

25 to Life

Is calling it 'digital crap' too harsh?

There's a lot of shooting in *25 to Life*, but it's all in the same corridor-like areas, such as this Mexican alleyway. Yawn.

It's not often a game like *25 to Life* comes along. A game so lame and insulting that it makes you want to reformat your hard drive after uninstalling it, just to get the stench off the platters. Sure, crap shooters have been around since the birth of PC gaming, but blatant rip-off titles like this *GTA*-wannabe deserve to be shunned, renounced, and burned in a fiery pit for the abomination they are.

You'll play three different characters as you progress through this third-person shooter—two gangsters and one police officer—all intertwined in a cheesy tale of betrayal and revenge. The variation in how each character's story plays out is breathtaking. You start as a character named Freeze, and in the very first level you slaughter hundreds of cops. Next you play as a cop, slaughtering hundreds of bad guys. Then, you are another gangster who has to slaughter hundreds of bad guys, and so on and so forth. The levels are so incredibly linear and repetitive that it's laughable and boring. You move forward, kill everyone you see, pick up the floating health pack, turn the next corner, and repeat, until the silly and profanity-laden cutscene arrives. The entire six-hour experience is like this. Once you've played this game for five minutes, you've seen everything it has to offer.

The multiplayer experience is thankfully better than the single-player, but that's not saying much. It's essentially team deathmatch, where you and your posse run around trying to kill everyone on the other team. It's reminiscent of early *Quake* deathmatch, or any other rudimentary online shooter. The real treat is that when you accomplish side objectives in the single-player portion of the game (such as 12 head shots in one level, for example), you're awarded special jewelry and other accoutrements in multiplayer, so other players will recognize your skill. Sadly, the interface is so awkward that just entering a server is a chore.

We also experienced several bugs, including vertigo-inducing screen-spinning, audio bugs, and cutscenes playing way too fast to comprehend.

Need we even bother saying that you shouldn't buy this game?

—JOSH NOREM

25 TO LIFE **2**

$30, www.25tolife.com, ESRB:M

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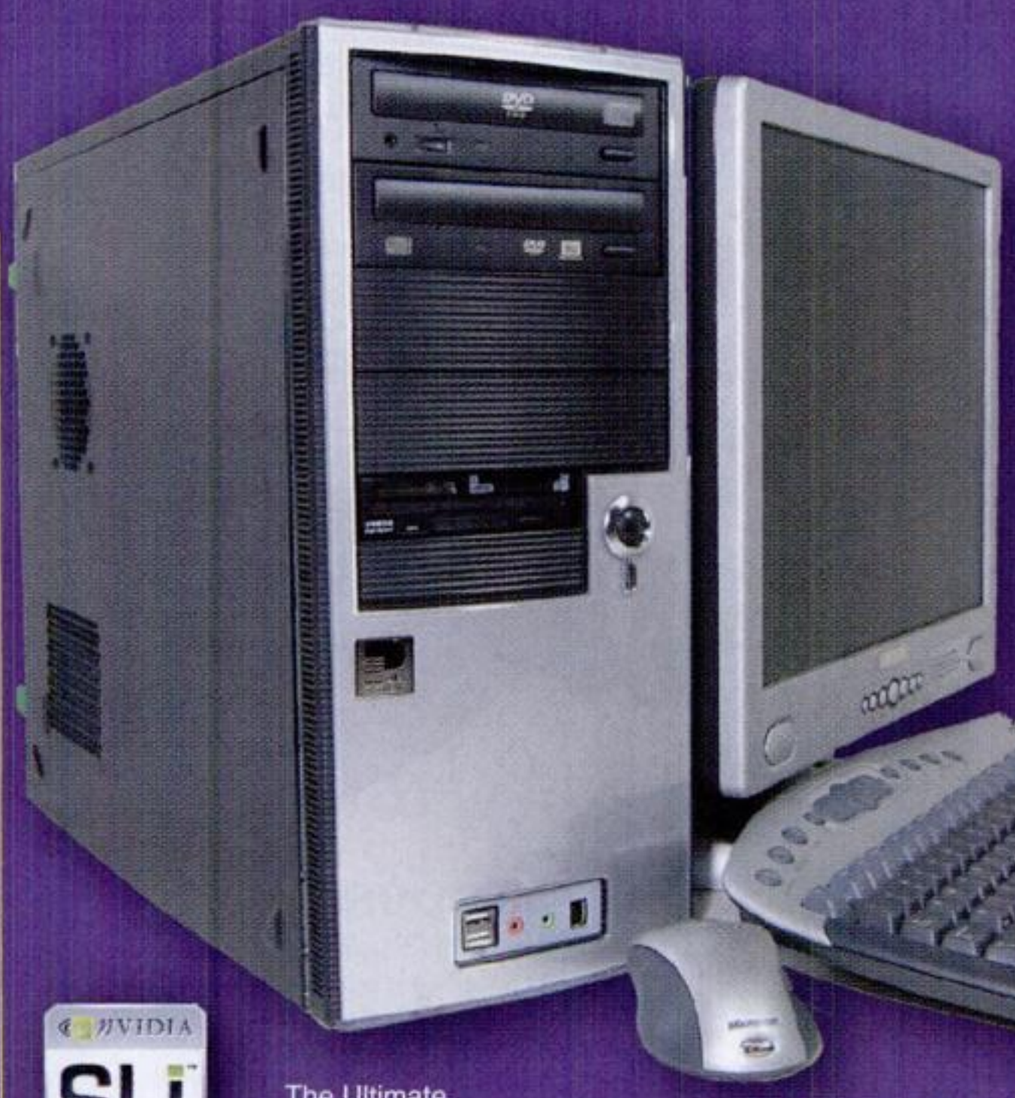

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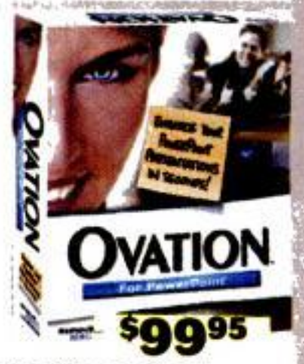

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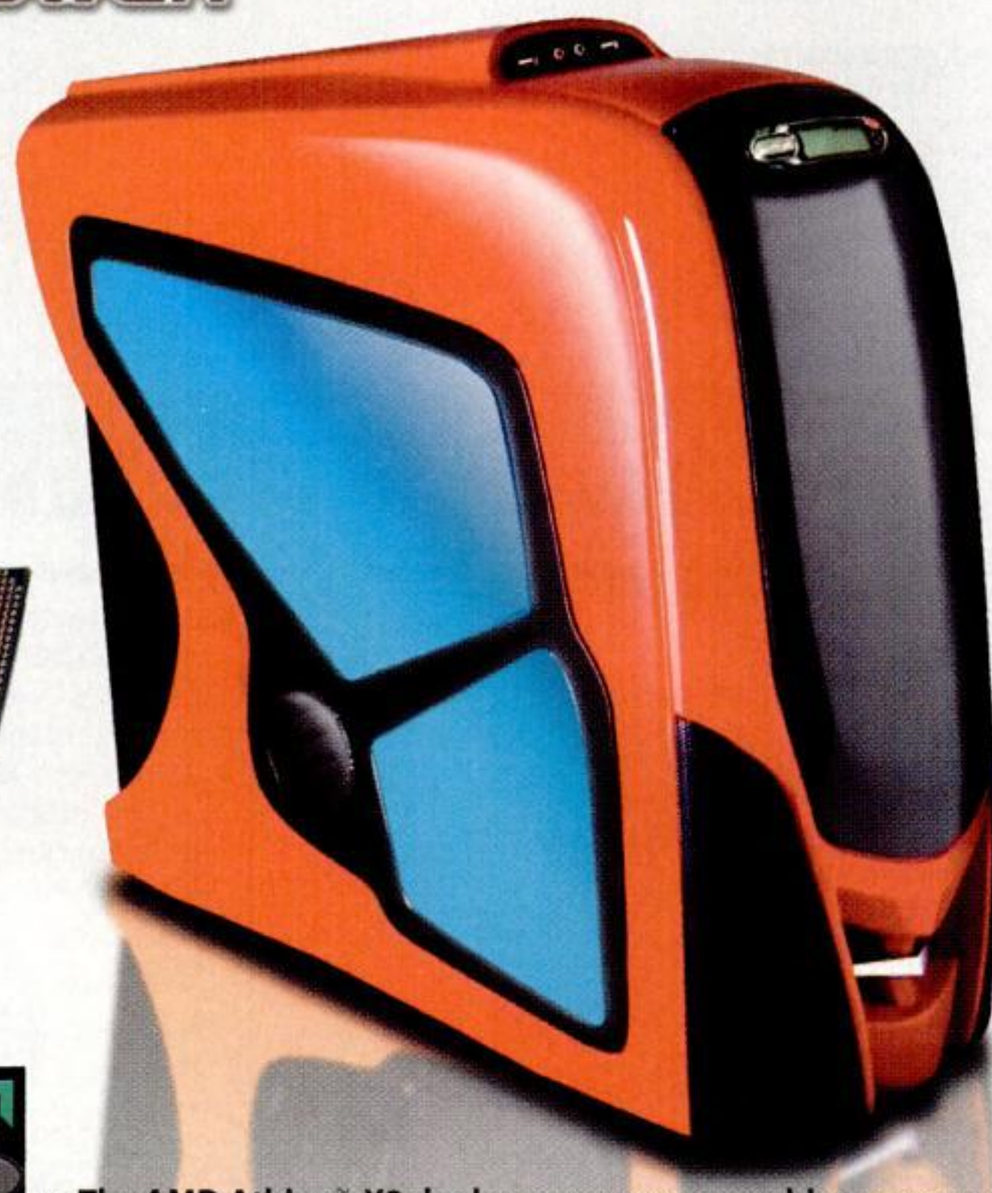

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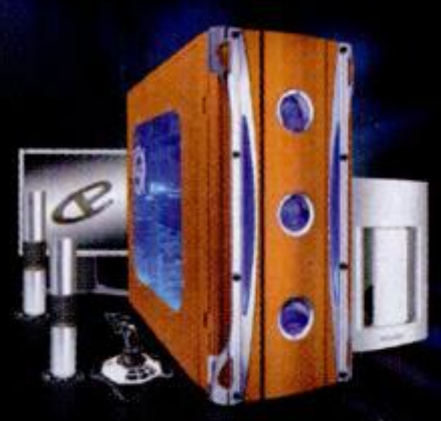

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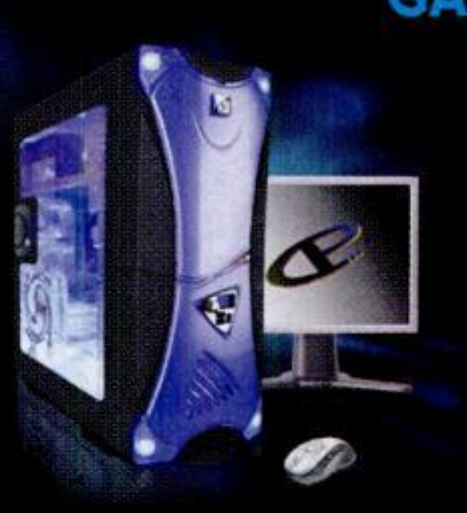

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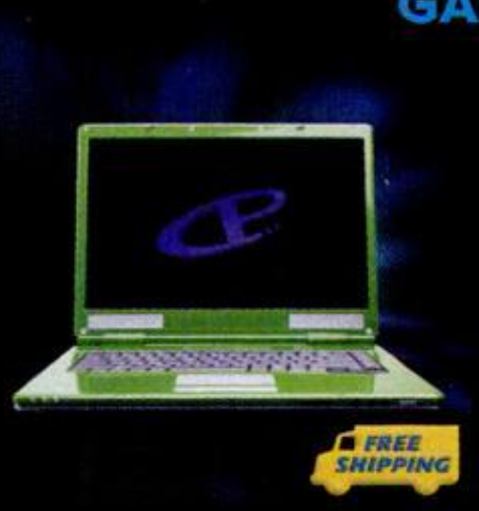

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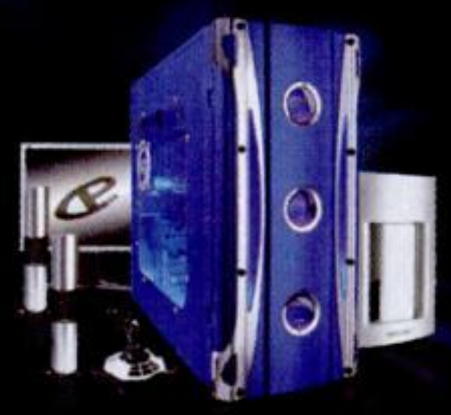

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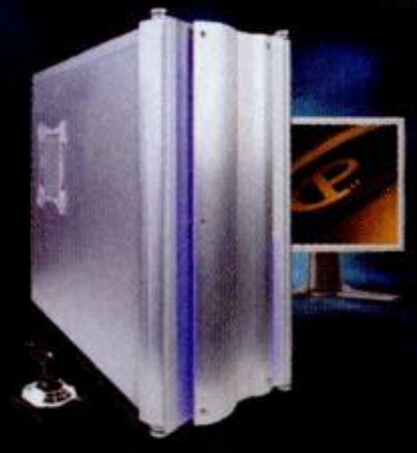

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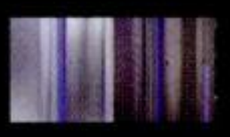

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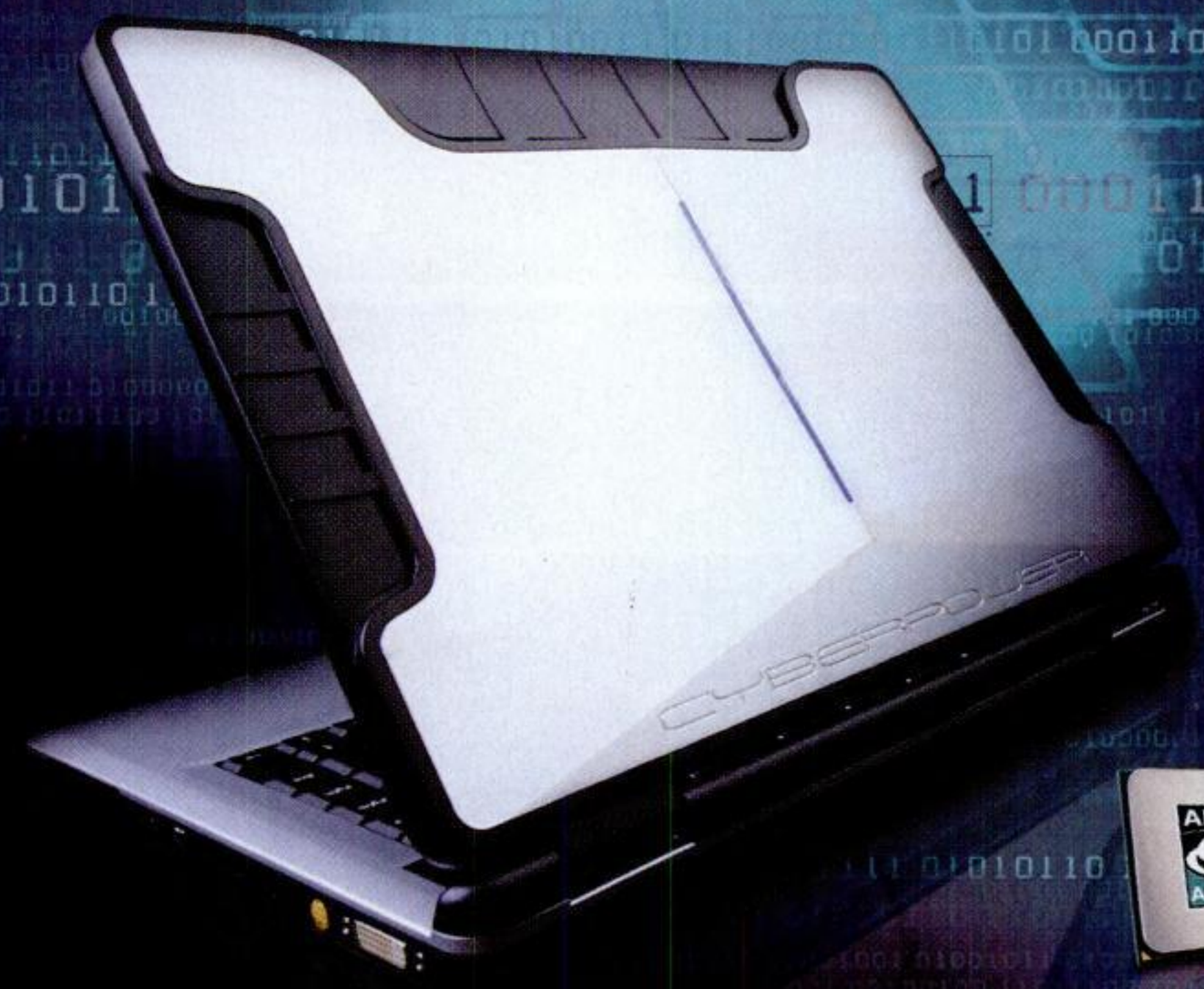

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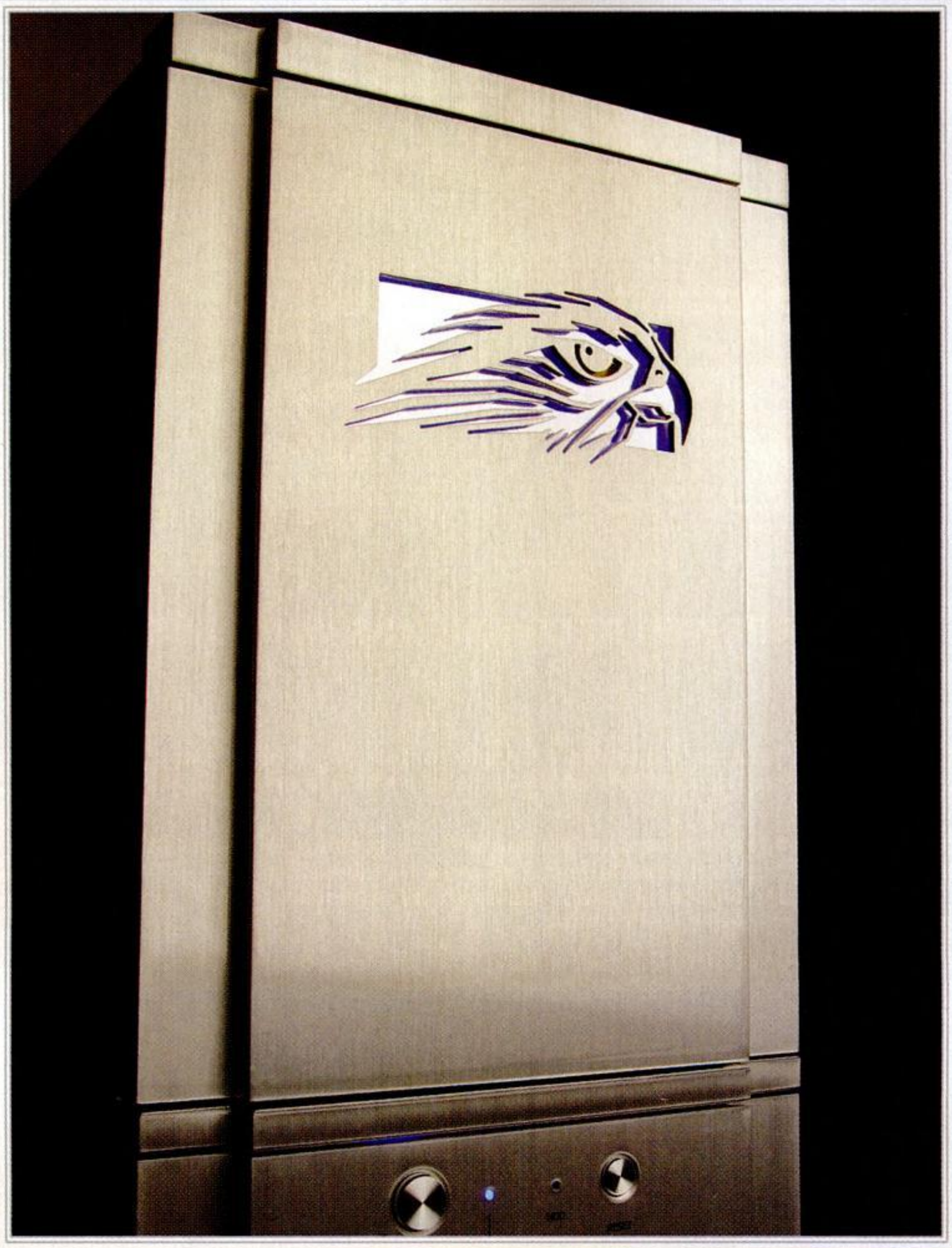

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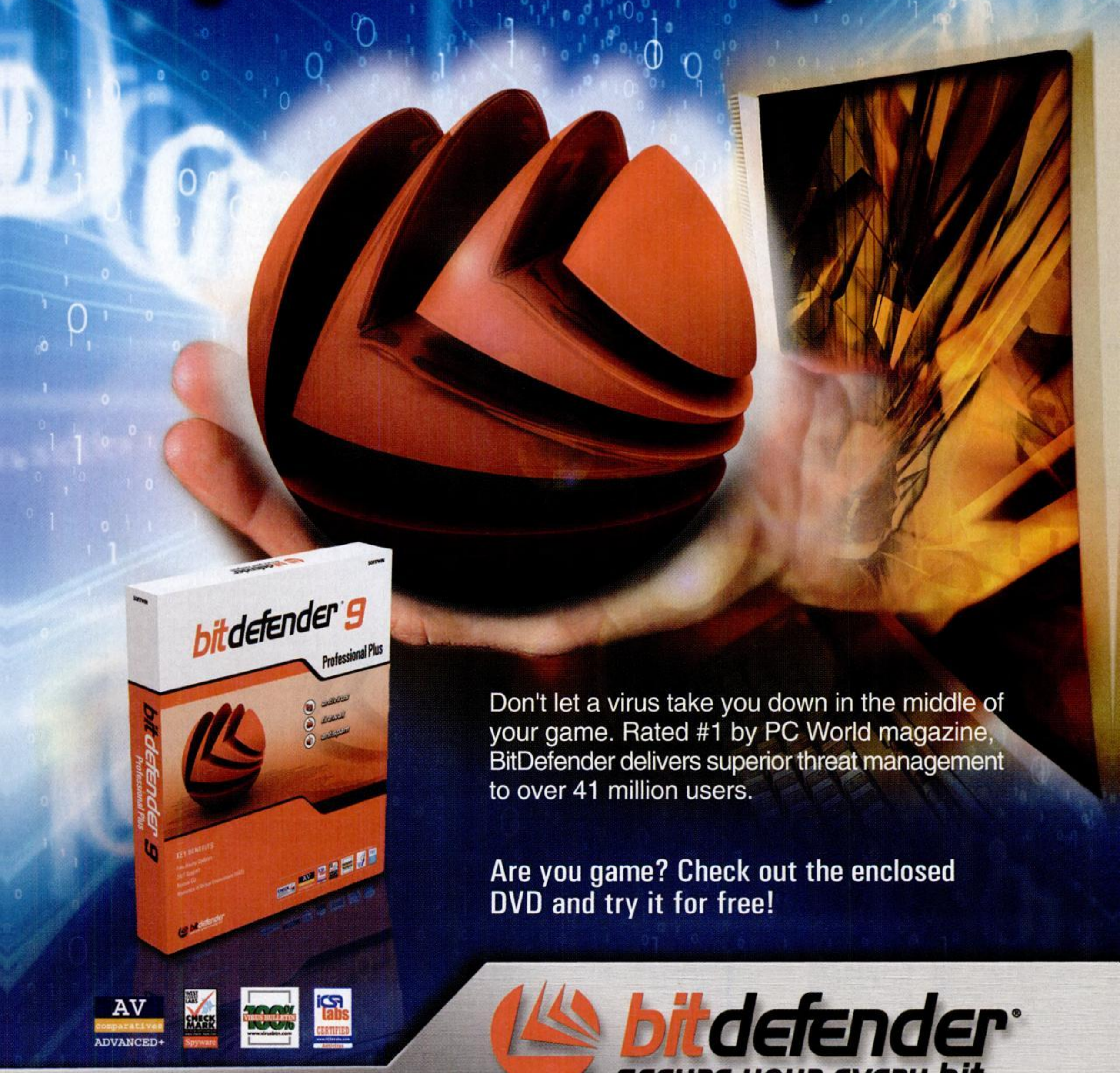

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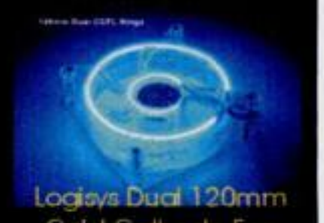

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ONE ENTRY PER HOUSEHOLD. Your contest entry will be valid until (1) six months after its submission or (2) October 15, 2006, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the January 2007 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent. By entering this contest you agree that Future US, Inc. may use your name and your mod's likeness for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future US, Inc. is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future US, Inc. c/o Maximum PC Rig of the Month, 4000 Shoreline Ct, Suite 400, South San Francisco, CA 94080. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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We tackle tough reader questions on...

✓Memory Dividers ✓Console vs. PC ✓Premiere Elements ✓Dying AGP

DIVIDING THE MEMORY

One thing you forgot to cover in your March 2006 cover story ("Overclock Your PC") is the memory divider.

Sure, an Athlon X2 3800+ can overclock to 2.6 GHz, but only if you use a memory divider, or if you have some DDR533 memory (DDR500 if you're lucky). In fact, advising people to up their core voltage if they run into an overclocking wall might lead people to the entirely wrong next step, because they wouldn't realize they might be hitting the wall not because of their CPU, but because their DDR400 memory can't run at 230MHz.

By selecting a different divider in the BIOS, they can solve their problems without giving their CPU an unnecessary voltage increase. If an overclock fails to boot while increasing the FSB and using dividers to keep the memory within spec, then give the CPU more juice.

—Steve Stormont

SENIOR EDITOR JOSH NOREM RESPONDS: You're absolutely right, Steve. For readers who aren't in the know about memory dividers, here's the scoop: When overclocking a PC, most people crank up the front-side bus speed. When you do this, you're also overclocking your memory at the same time. Most bargain-bin or value RAM won't overclock beyond its designed speed, so this can create a bottleneck in a typical overclocking scenario.

Enter the memory divider. It allows the memory to run at an independent speed from the actual FSB speed, so you can crank up the FSB speed to overclock the CPU, while leaving the memory at stock speeds. This allows you to increase the speed of the CPU by itself, leaving the memory out of the equation.

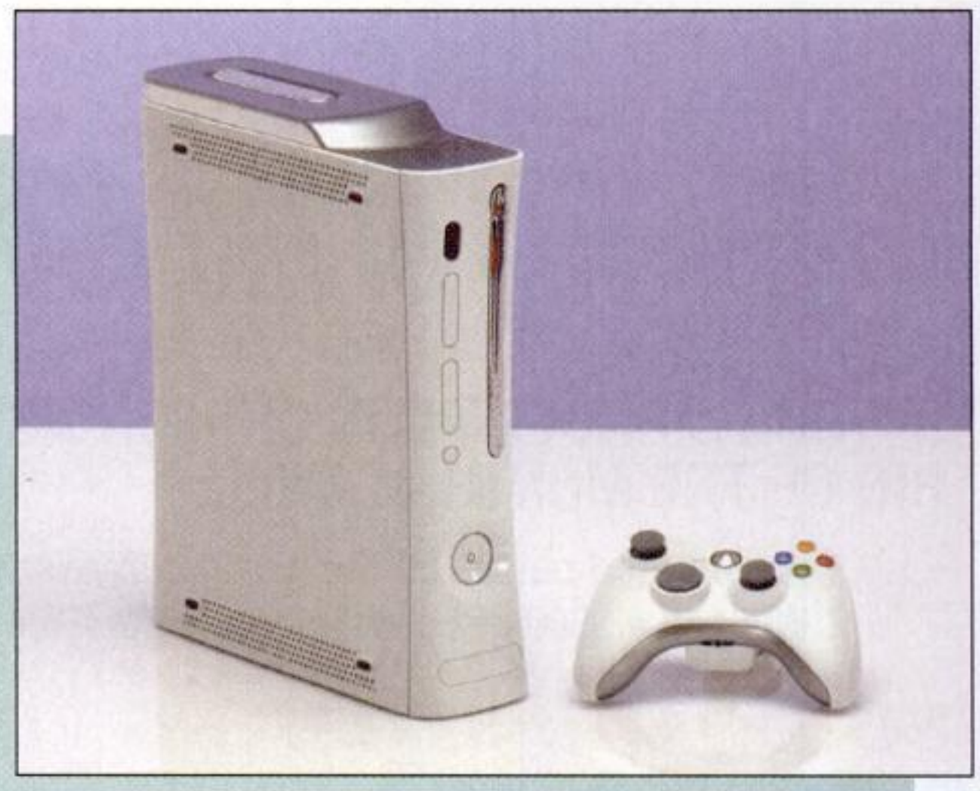
HYPERSPEED HYPERTRANSPORT

On the AMD platform, overclocking without lowering the HyperTransport multiplier is a surefire way to create an unstable condition. If you really want to get the most out of your Athlon 64 overclock, you need to know to manually tweak its speed.

—Albie Day

SENIOR EDITOR JOSH NOREM RESPONDS: We've had good luck overclocking our Athlon 64 systems without changing HyperTransport frequencies, but you can almost certainly get more power if you do. The HyperTransport link is the connection between the processor and the chipset (but not the memory) on an Athlon 64 system. By upping the FSB, you are cranking up the speed of this interconnect, which can lead to instability. The default ratio of this connector is 5, which multiplies by the 200MHz base clock to equal a 1000MHz interconnect speed. Some motherboards let you crank this multiplier up or down, so you can overclock the front-side bus while keeping the HyperTransport interconnect running at stock speed to maintain system stability.

Console Games Just Work



I read your article in the March issue comparing Xbox 360 and a PC (Head2Head). I mostly agree with what you said, but you left out a very important part. When I insert a game in the Xbox 360, I know it's going to work and I'll be able to play immediately. On the PC it's not guaranteed! Drivers don't always work. Unusual components or bugs in the game can prevent me from playing. The Xbox 360 would clearly win the stability category. Also, in your price comparison, I would make it a tie, because you do need a $1,000-plus HDTV to enjoy those nice 720p graphics!

—Steve Chapdelaine

EDITOR IN CHIEF WILL SMITH RESPONDS: While you raise some good points, bugs are by no means a PC-specific phenomenon. There's a well-known bug in the Xbox's *Dead or Alive 4* that wipes out all your progress in the game. We've also heard reports of consoles overheating, crashing, and mistaking game discs for DVDs. And while console games have become buggier, PC games are actually getting better and easier to run. We still detest long install times and clicking idiotic license agreements, but once the game is installed, everything usually works for us.

CUTCOPYPASTE

An infographic in the February issue incorrectly stated the speed of the crossbar in AMD's dual-core processors. The speed of the crossbar is the speed of the processor, or 2.6GHz in the Athlon 64 FX-60.

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STEVE SAYS PREMIERE ELEMENTS SUCKS

Shame on Gordon Mah Ung. I take great issue with his 9 verdict and KickAss rating for Adobe ***Premiere Elements/Photoshop Elements*** *(March 2006). It has been priced for and focused on the consumer market, but it requires high-end hardware for* ***Premier Elements*** *to install.*

Premiere Elements *requires the SSE2 instruction set, which is only found on Intel Pentium 4 CPUs made since 2001, and AMD processors made in just the last couple of years.*

Athlon XPs and even some Semprons sold today do not support SSE2, and thus will not work with this product. To make a "home-user" product dependent on an exclusionary and performance-insignificant instruction set doesn't sit right with me!

—Steve McCurdy

SENIOR EDITOR GORDON MAH UNG RESPONDS: *Premiere Elements 2.0* requires SSE2 to run, which is written fairly explicitly on the box. But we wouldn't exactly call the SSE2 requirement "high-end." SSE2 was introduced with the original Willamette Pentium 4 core about five years ago and has been in every Intel processor since, as well as every K8-core Athlon, including the Athlon 64, FX, and X2 series. As nice as it would be for the product to install on ancient CPUs, we generally applaud applications that make full use of a newer technology, whether it's SSE2, AMD64, or dual cores. It's kind of like running *FEAR* on a GeForce 3 card. The game might load and it might even run, but why bother?

LINUX THE NOT-SO-EASY WAY

Thanks to Will Smith for his article called "Install Linux The Easy Way" in January 2006. It provided the impetus to dust off an old system and finally give Linux a shot. However, I had a problem when I was following the instructions.

I couldn't get my burned CD with the Ubuntu distro to be recognized as a bootable disk. I kept getting a "Non-system or disk error." After much head-scratching and web surfing, I found a program called ***ISO Recorder****.*

Using it, I was able to burn the Ubuntu ISO file to a disc, which booted fine. Did I miss something? What did the ***ISO Recorder*** *software do anyway to give me a valid Ubuntu install disk?*

—Lloyd Noel

EDITOR IN CHIEF WILL SMITH RESPONDS: Your CD mastering program didn't know how to handle the ISO file, which is simply an already-built disc image. If you burn the Ubuntu ISO file as a plain data disc instead of as an image, your computer won't be able to boot off it. *Nero*, our burning app of choice, automatically makes the image file into a working disc; other burning apps, including the one built into Windows, don't.

IS AGP REALLY DEAD?

In the March 2006 In/Out section, you recommend against buying an AGP card, instead suggesting that readers save up to upgrade to a PCI-E mobo and card later on. But what if my current card is on the verge of biting the dust and I only have enough funds to purchase a videocard? You say that manufacturers won't put their latest GPUs on AGP cards, but what about the nVidia 7800 GS? You can get it in AGP trim, and it's selling for $300. Is it worthwhile getting that card over an older 6800 Ultra, or should I go with ATI and purchase an X850 XT card? I want the card to last, performance wise, at least one to two years. What would you recommend?

—Alex Pirogov

EXECUTIVE EDITOR MICHAEL BROWN RESPONDS: We were as surprised as anyone to see nVidia announce an AGP version of its high-end GeForce 7800 GPU. I haven't tested it, because we no longer cover AGP videocards, but I would expect it to give both the Radeon X850 XT and the 6800 Ultra a run for their money. If you're on a tighter budget, the AGP version of the 6800 GS is a terrific value, too. Here again, however, you should take my comments with a grain of salt, because we've only tested the PCI Express version of that GPU.

If you're a gamer, one of the biggest reasons to favor either of these GPUs over an AGP version of ATI's X850 XT is the formers' support for Shader Model 3.0. A significant number of game developers are moving to take advantage of the additional power that SM 3.0 offers, and ATI's chips prior to the X1000 series don't support it. That doesn't mean new games won't run on those chips—developers will no doubt include code to fall back to SM 2.0 while running on older GPUs—but you could lose out. MPC

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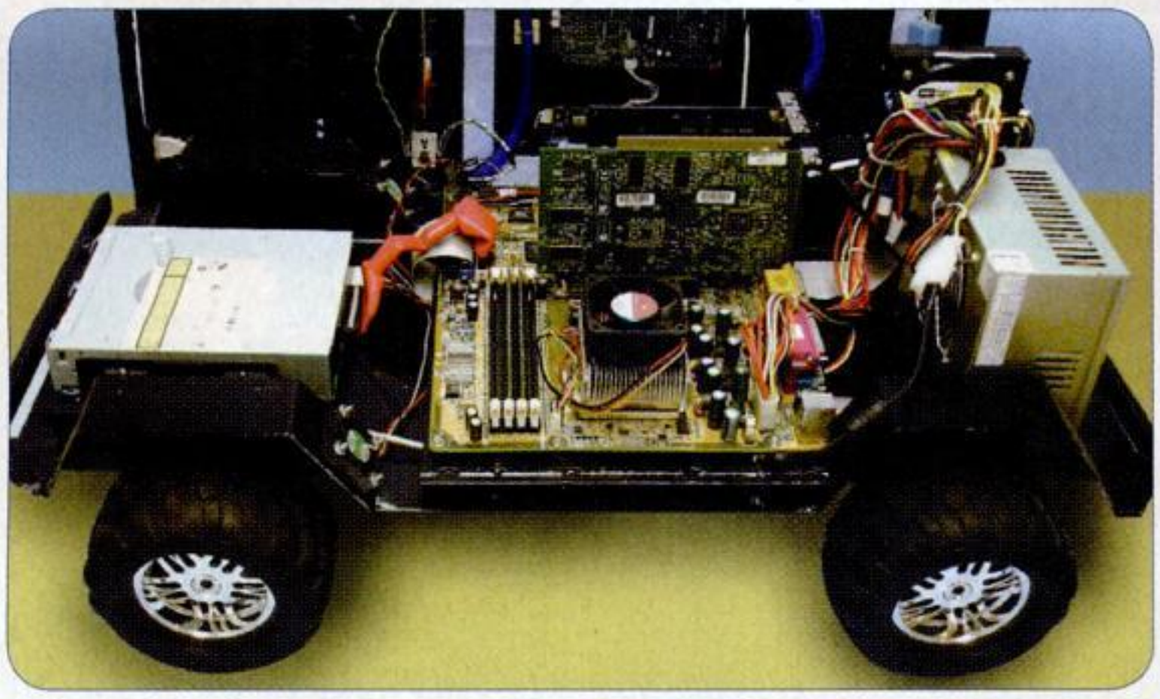
RICHARD SHERMAN'S

Bronco Mod

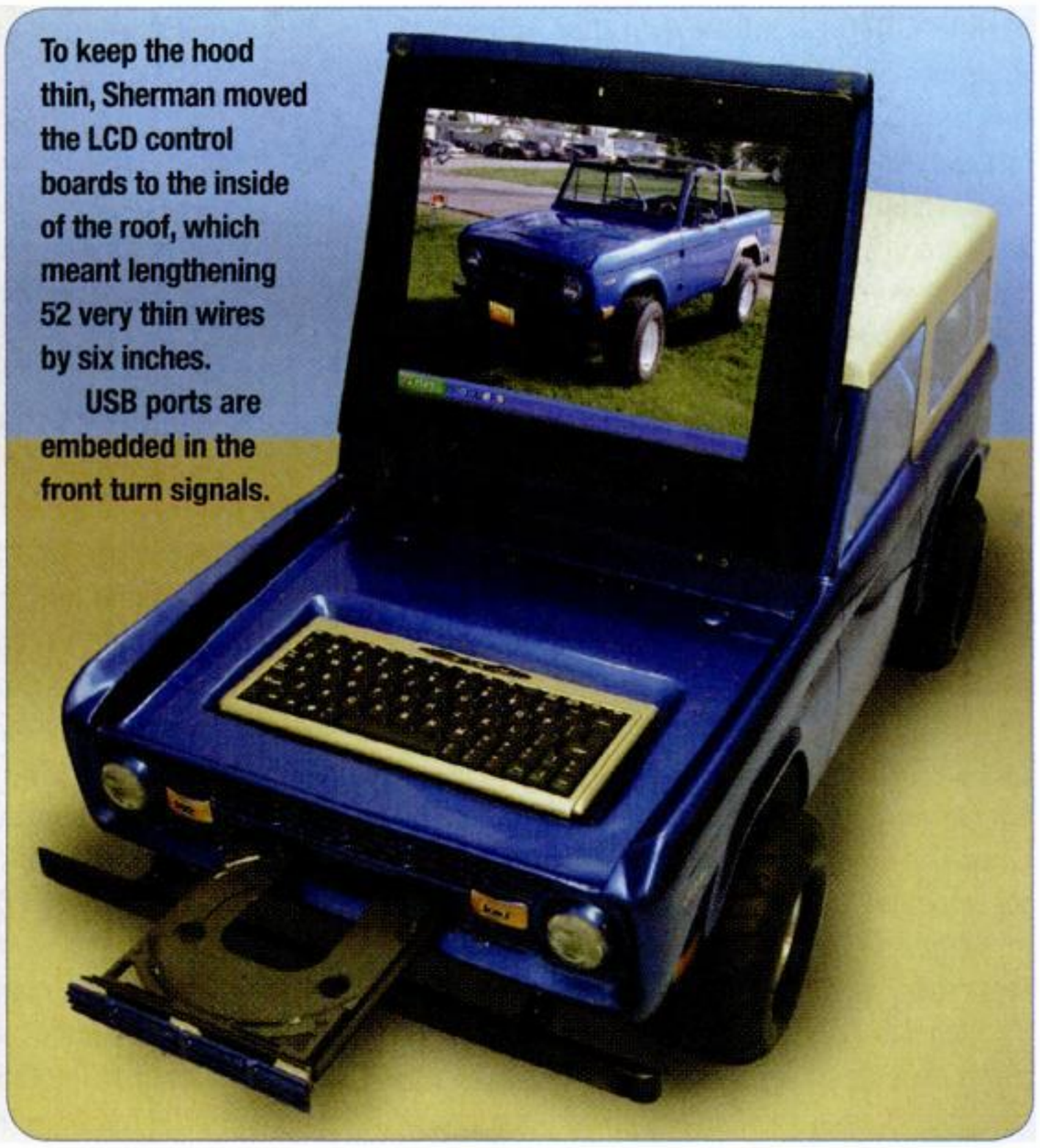
Richard Sherman had just finished rebuilding his full-size '69 Ford Bronco when he got the idea for a PC mod: a small-scale clone of his beloved truck. With help from fellow machinist and friend Mike Brandenburg, Sherman turned out an uncanny likeness of the vehicle. We're talking precise 1/5-scale proportions, authentic Intense Pearl Blue auto paint, and miniature Bronco emblems. It's fitting that the PC now lives in Sherman's garage, where he can listen to his MP3s while he tinkers on the rig's big bro.

A solid-steel frame, complete with bumpers that serve as carrying handles, holds all the parts—the PC is compact, but totally self-contained. The PSU, audio, and Ethernet are all situated so that cords come out the bottom, by the back bumper.



To keep the hood thin, Sherman moved the LCD control boards to the inside of the roof, which meant lengthening 52 very thin wires by six inches.

USB ports are embedded in the front turn signals.



For his winning entry, Richard Sherman wins a $500 gift certificate for TigerDirect to fund his modding madness! See all the hardware deals at www.tigerdirect.com, and turn to page 109 for contest rules.

First, Sherman created a clay model of the truck, then he fashioned a rubber mold, and from that a fiberglass body. And then he set to work sanding. And sanding. And sanding. Follow that up with four coats of paint and four coats of clear coat, and you're looking at one cherry exterior.

The rig weighs 49 pounds. It's held up by a set of RC truck tires, in addition to a set of steel legs mounted against the inside of each tire. Those legs help support the rig's heft and prevent perilous rolls off any tables.

If you have a contender for Rig of the Month, e-mail **rig@maximumpc.com** with high-res digital pics and a 300-word write-up.

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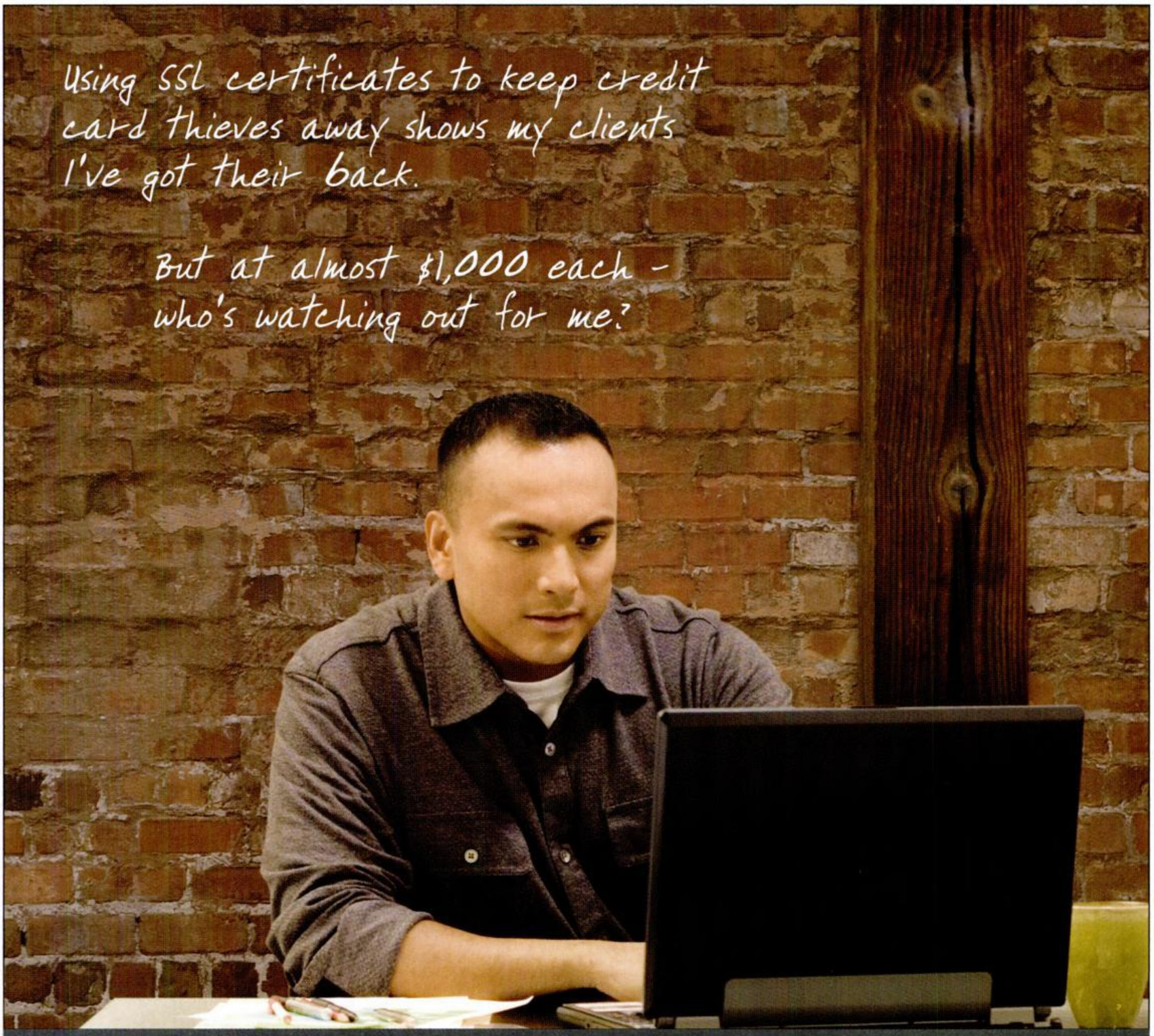

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